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AND
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TRANSPORTATION ADMINISTRATION

LAKEHEAD HARBOUR COMMISSION

EVALUATION OF THE ATARA PISTON BUBBLE CANNON MIXER FOR ICE SUPPRESSION

Thunder Bay, Ontario

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VB COOK CO LIMITED CONSULTING ENGINEERS

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17 Abstract

During the spring of 1982 five Atara air cannon mixers were installed in the slip adjacent to the Canada Malting Co. dock at Thunder Bay, Ontario. As part of the evaluation of these mixers as ice management devices, V.B. Cook Co. Ltd. was tasked with monitoring their performance during the period of operation. This report presents the results of these observations.

The "piston bubble cannon mixers" were successful in melting ice during the test period. The amount of ice melted per unit of air flow was not as high as a line bubbler system monitored simultaneiously in another slip. However, the ease of installation and removal of the unit through the ice during the shipping season make the air cannon more suitable for centre slip application than the line bubbler system.

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17 Résumé

Au printemps de 1982, cinq mélangeurs statiques à macro-bulles Atara ont été installés au fond du bassin de chargement desservant la Canada Malting Co., à Thunder Bay, Ontario. Le suivi de l'exploitation expérimentale du système a été confié à la firme V.B. Cook Co. Ltd. qui présente, dans ce rapport, les résultats acquis pour les besoins de l'évaluation.

Ces mélangeurs statiques ont réussi à faire fondre la glace durant la période d'essai; toutefois, le rapport quantité de glace fondue/débit d'air mis en oeuvre n'est pas aussi bon que celui obtenu par les systèmes à diffuseurs d'air expérimentés en même temps dans un autre bassin. Par contre, ils conviennent mieux pour faire fondre la glace au centre des bassins que le système à diffuseurs d'air, leur mise en place au fond d'un bassin gelé et leur récupération en pleine saison de navigation ne posant aucun problème.

18 Mots-clés	19 Diffusion
Maîtrise des glaces, lutte contre les glaces dans les ports, système à diffuseurs d'air, technogénie des glaces	Le CDT dispose d'un nombre limité d'exemplaires

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EVALUATION OF THE ATARA AIR CANNON MIXER FOR ICE SUPPRESSION THUNDER BAY, ONTARIO

Prepared for:

TRANSPORT CANADA
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AND
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In Co-operation with:

LAKEHEAD HARBOUR COMMISSION
THUNDER BAY, ONTARIO

JUNE, 1982

PROJECT NO. 80-211-02

V. B. COOK CO. LIMITED
CONSULTING ENGINEERS
THUNDER BAY, ONTARIO

DISCLAIMER

The contents of this report reflect the views of the Engineer and not necessarily the official views or policies of the Transport Canada Transportation Development Centre.

PROJECT TEAM

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SUMMARY

The "Piston Bubble Cannon Mixers" were successful in melting ice during the test period. Although the amount of ice melted per unit air flow was not as high as the line bubbler system that was being simultaneously monitored in an adjacent slip, it is postulated that a modified installation technique will greatly improve the performance of these units.

Single unit systems like these "Air Cannons" have an important advantage over line bubbler systems. Line bubblers installed in center-slip configurations are difficult to protect against anchor and propwash damage during the regular shipping season. These single units, on the other hand, can be installed through the ice before the beginning of a new shipping season and are easily retracted from the slip when the ice has been melted. They are consequently immune to anchor and propwash damage.

* * * * * * * * * * *

The general mathematical approach used to model the performance of the Air Cannons as bubblers, was the method developed by Ashton. Although this approach had to be modified slightly to normalize the differences between line bubblers and Air Cannons, the method is both valid and serves as an excellent tool to evaluate the performance of both systems.

* * * * * * * * * * *

The Air Cannons are a viable means to clear ice from harbour slips. However, it is recommended that the method used to install and operate these units be modified to provide greater ice melting capacity.

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Introduction

On March 5, 1982, Atara Corporation installed 5 "Piston Bubble Cannon Mixers" in the slip beside the Canada Malting Co. grain elevator in Thunder Bay.

In order to evaluate the performance of the 5 units, this study was undertaken.

The study was co-sponsored by The Lakehead Harbour Commission and Transport Canada Transportation Development Centre as part of a Task Force study investigating various techniques of ice control in the harbour at Thunder Bay.

This report describes the monitoring carried out and presents the data. The results are analyzed and compared to the performance of the line bubbler system installed at Saskatchewan Wheat Pool No. 7 elevator slip.

V. B. Cook Co. Limited, Consulting Engineers, were engaged to conduct monitoring and to report on the performance of the air cannon mixers as devices to suppress ice.

The monitoring included the following parameters:

1. Climatic conditions
2. Ice growth and deterioration
3. General observations during the operational period

Operational parameters of air pressure and air flow were set and maintained by Atara Corporation personnel throughout the duration of the test period.

2. MAIN TEXT

2.1 Description

The "Atara Piston Bubble Cannon Mixer" is a device which propels fluid by means of a rising piston bubble of air.

Physically, the device looks like a tube with a weighted baseplate bridled to one end. When installed at the bottom of a body of water, the baseplate anchors the tube, which assumes a vertical attitude above the baseplate.

A bubble generator located at the base of the tube emits, at regular intervals, a large bubble of air. The bubble rises in the tube pushing fluid ahead of it and

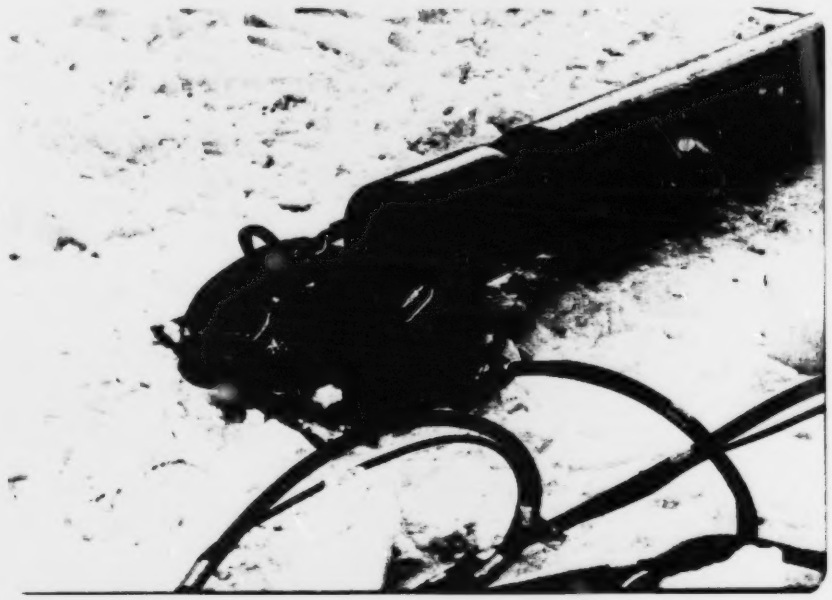
drawing replacement fluid into the tube behind it. The replacement fluid enters the tube through ports located in the tube just above the generator.

The bubble exits from the top of the tube entraining an increasingly larger volume of fluid as it ascends to the surface.

In the case of this apparatus being used to melt ice, the flow of air and water produced by the apparatus impinges on the ice cover resulting in thermal erosion of the ice cover.

Figure 1 shows the bubble generator, flotation collar and baseplate. Figure 2 shows the same items incorporated with a barrel extension.

Bubble Generator, Flotation Collar and Base Plate
Figure 1



Same as Figure 1 with Barrel Extension
Figure 2

The 5 cannons were positioned in the slip adjacent to the Canada Malting Co. elevator. Three units (No. 1, 2 and 3) were installed beside the wharf and 2 units (No. 4 and 5) were installed in the center of the slip.

A 38 station ice thickness measuring grid was superimposed on the 5 cannon stations. Ice thickness soundings were taken at each of these stations at regular intervals during the test period. Drawing No. 501 shows the location of the five air cannons and 38 station grid.

2.2 Procedure and Observations

The air cannon system was operated and monitored from March 5 to April 14, 1982. Ice thickness measurements were taken from March 5 to March 18 but were discontinued because of the potential hazard of open water and thin ice. Sequential photographs were used to monitor the ice deterioration from March 6 to March 29, 1982.

On March 5, 1982, the cannons were inserted under the ice through holes (approximately 1m x 1m) cut in the ice cover of the slip by a chain saw.

Manipulating a 3.6m Unit
Figure 3

Figure 3 shows the relative ease of installation of a 3.6m unit.

A 7½ h.p. blower supplied the 5 cannons with air in the following quantities:

#1	17 m^3/h (standard air)
#2	22 m^3/h
#3	24 m^3/h
#4	10 m^3/h
#5	10 m^3/h
TOTAL	83 m^3/h (standard air)

Blower delivery pressure was 83 to 90 kPa. The complete system, 5 cannons and 1 blower plus connecting hoses, formed a compact and easy to handle system.

The system operated in a trouble-free mode for the duration of the test period.

Retrieval of the 5 bubble cannons was a smooth procedure. To bring each unit to the surface, the flotation collar was inflated and the unit floated and was pulled to the side of the wharf. Some difficulty was experienced hoisting the units from water to the surface of the wharf. This problem is minor, however, because future installations could easily include provision for better hoisting.

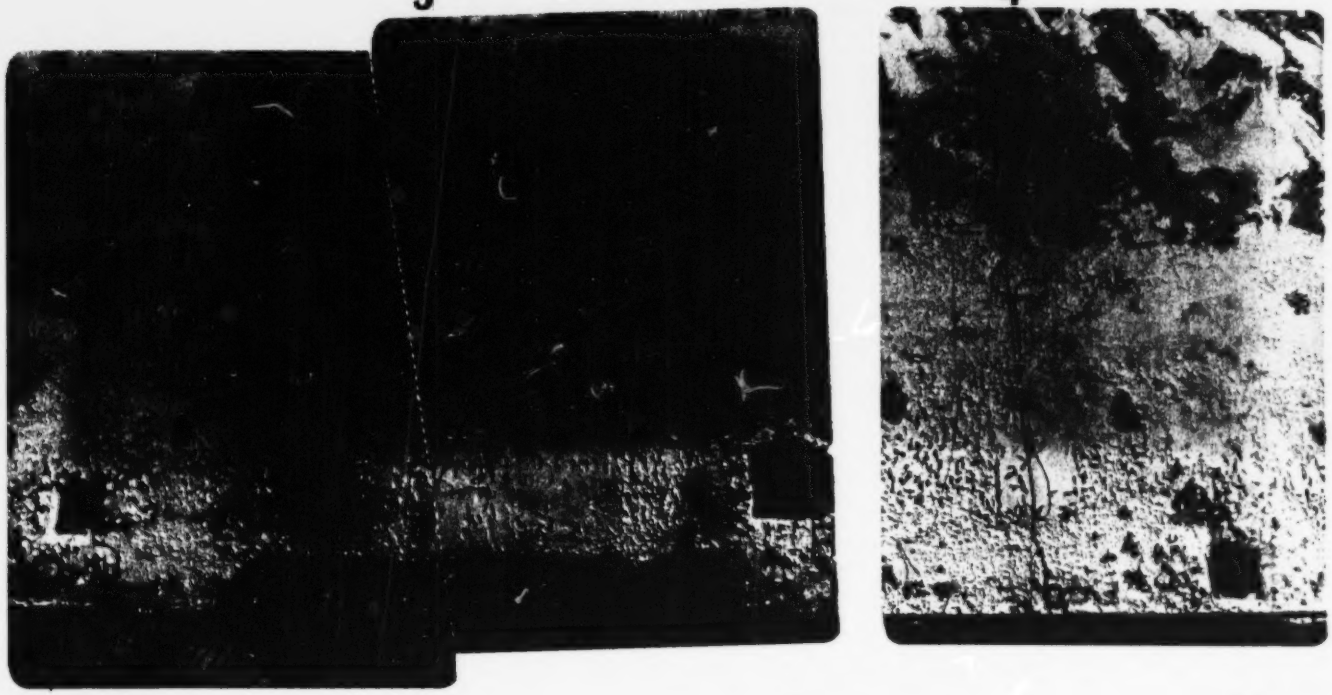
On March 6, 1982, seven high pressure air lines were inserted into the ice beside Saskatchewan Pool Elevator No. 7B on the south side of the slip. Eruptions of water from several of these lines flooded the area where #4 and #5 cannons were installed. The flooding formed areas of stratified ice and slush and subsequently rendered any observations and results suspect. Analysis and performance are therefore restricted to units #1, #2 and #3.

The ice thickness readings taken during the test period are compiled on drawing No. 502.

The overall ice deterioration of the 5 air cannons was monitored using sequential photographs. A representative selection of these photos are shown in Figure 4 through Figure 9.

CANNON SIZE Ø 0.3 M X 3.6 M
AIR VOLUME SUPPLIED = 10 M^3/H (STANDARD AIR)

Ø 0.3 M X 5.8 M LONG
10 M^3/H (STANDARD AIR)



0.3 X 5.8 M LONG
24 M^3/H (STANDARD AIR)

0.3 x 3.6 M LONG
22 M^3/H (STANDARD AIR)

0.3 X 0.6 M LONG
17 M^3/H (STANDARD AIR)

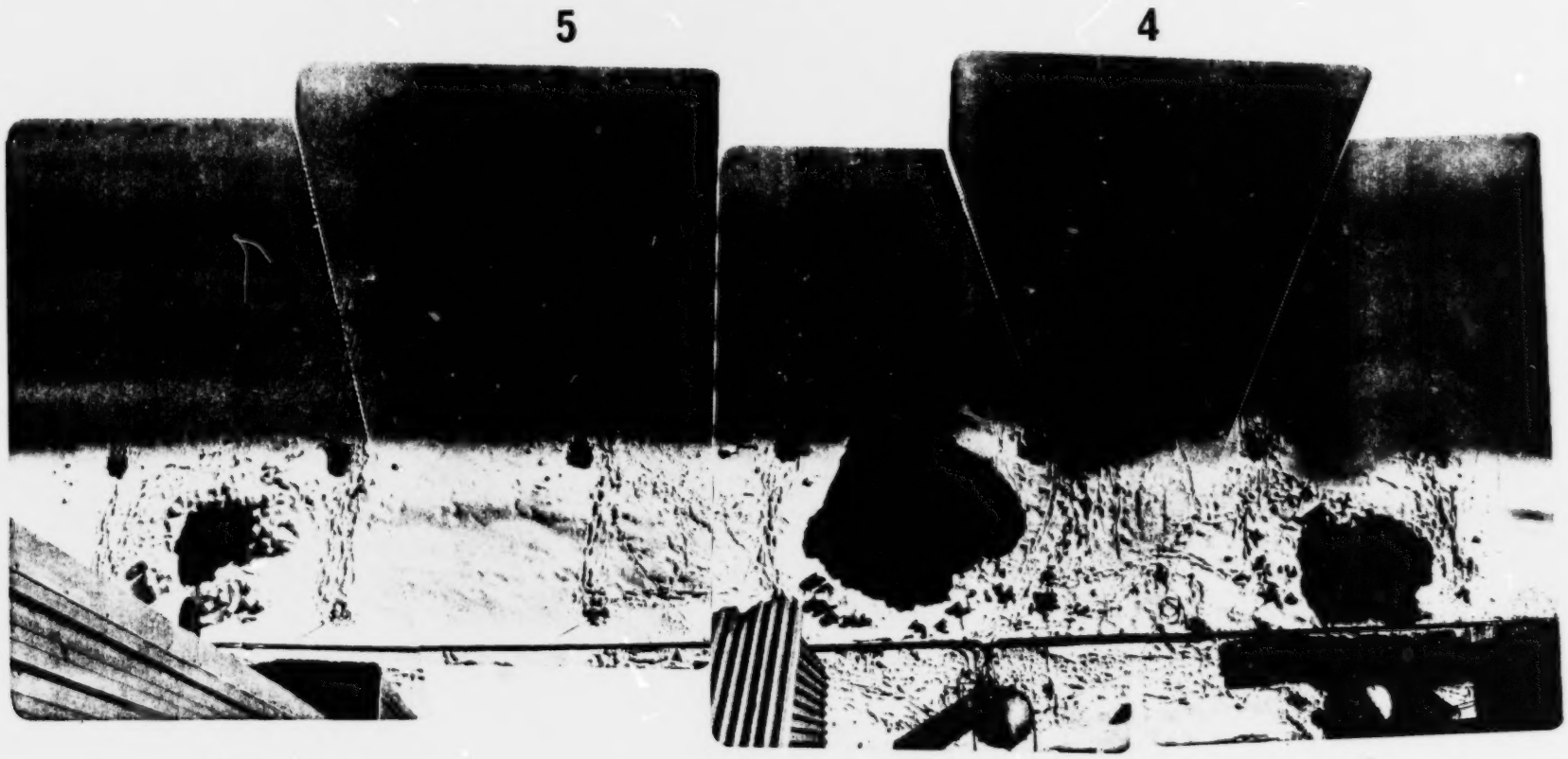
ATARA BUBBLER SYSTEM
PROJECT NO. 80-211-02

MARCH 6, 1982
ICE DETERIORATION

FIGURE 4

CANNON SIZE Ø 0.3 M X 3.6 M
AIR VOLUME SUPPLIED = 10 M^3/H (STANDARD AIR)

Ø 0.3 M X 5.8 M LONG
10 M^3/H (STANDARD AIR)



0.3 X 5.8 M LONG
24 M^3/H (STANDARD AIR)

0.3 x 3.6 M LONG
22 M^3/H (STANDARD AIR)

0.3 X 0.6 M LONG
17 M^3/H (STANDARD AIR)

ATARA BUBBLER SYSTEM
PROJECT NO. 80-211-02

MARCH 11, 1982
ICE DETERIORATION

FIGURE 5

CANNON SIZE Ø 0.3 M X 3.6 M
AIR VOLUME SUPPLIED = 10 M^3/H (STANDARD AIR)

Ø 0.3 M X 5.8 M LONG
10 M^3/H (STANDARD AIR)

3
0.3 X 5.8 M LONG
24 M^3/H (STANDARD AIR)

2
0.3 x 3.6 M LONG
22 M^3/H (STANDARD AIR)

1
0.3 X 0.6 M LONG
17 M^3/H (STANDARD AIR)

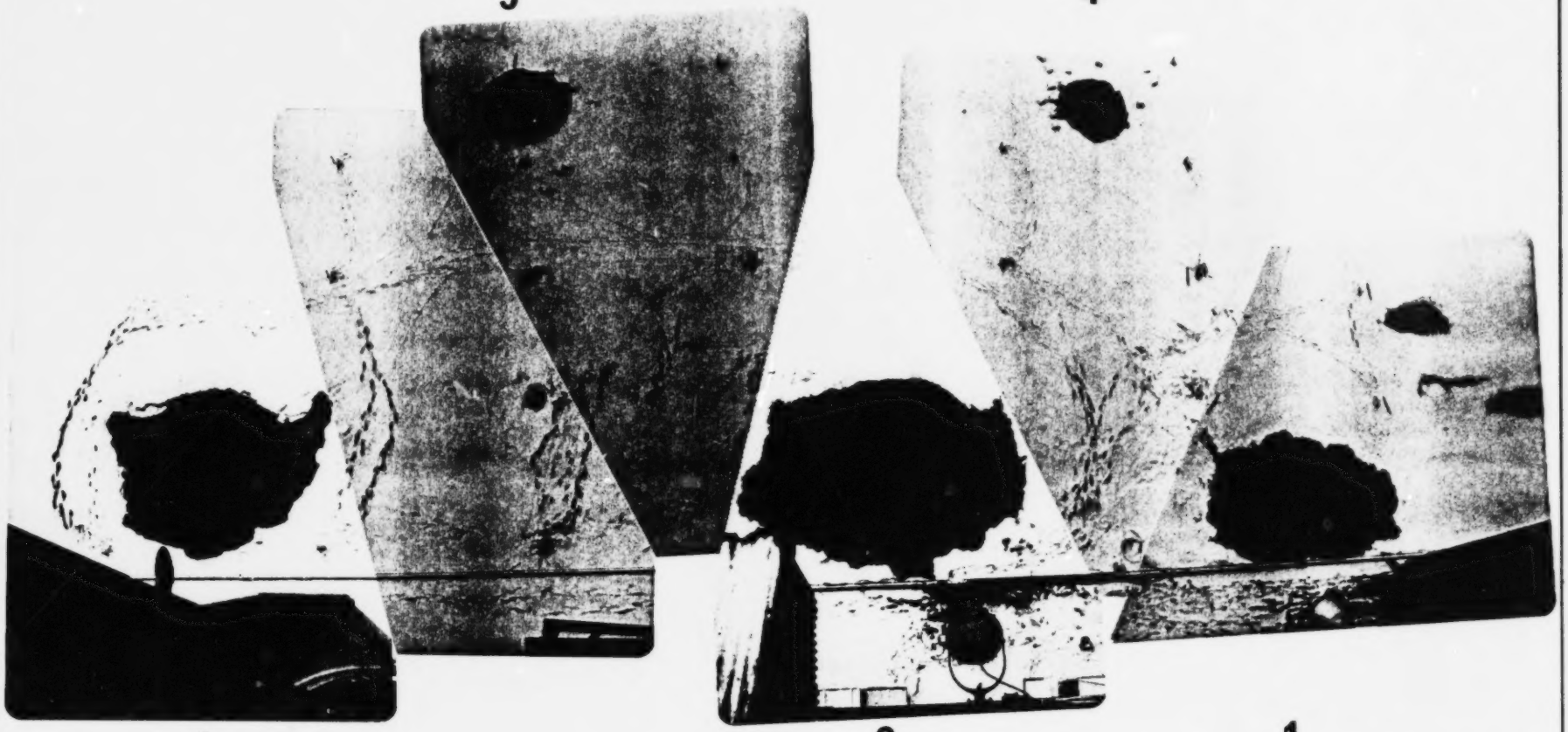
ATARA BUBBLER SYSTEM
PROJECT NO. 80-211-02

MARCH 15, 1982
ICE DETERIORATION

FIGURE 6

CANNON SIZE Ø 0.3 M X 3.6 M
AIR VOLUME SUPPLIED = 10 M^3/H (STANDARD AIR)

Ø 0.3 M X 5.8 M LONG
10 M^3/H (STANDARD AIR)



3

0.3 X 5.8 M LONG
24 M^3/H (STANDARD AIR)

2

0.3 x 3.6 M LONG
22 M^3/H (STANDARD AIR)

1

0.3 X 0.6 M LONG
17 M^3/H (STANDARD AIR)

ATARA BUBBLER SYSTEM
PROJECT NO. 80-211-02

MARCH 18, 1982
ICE DETERIORATION

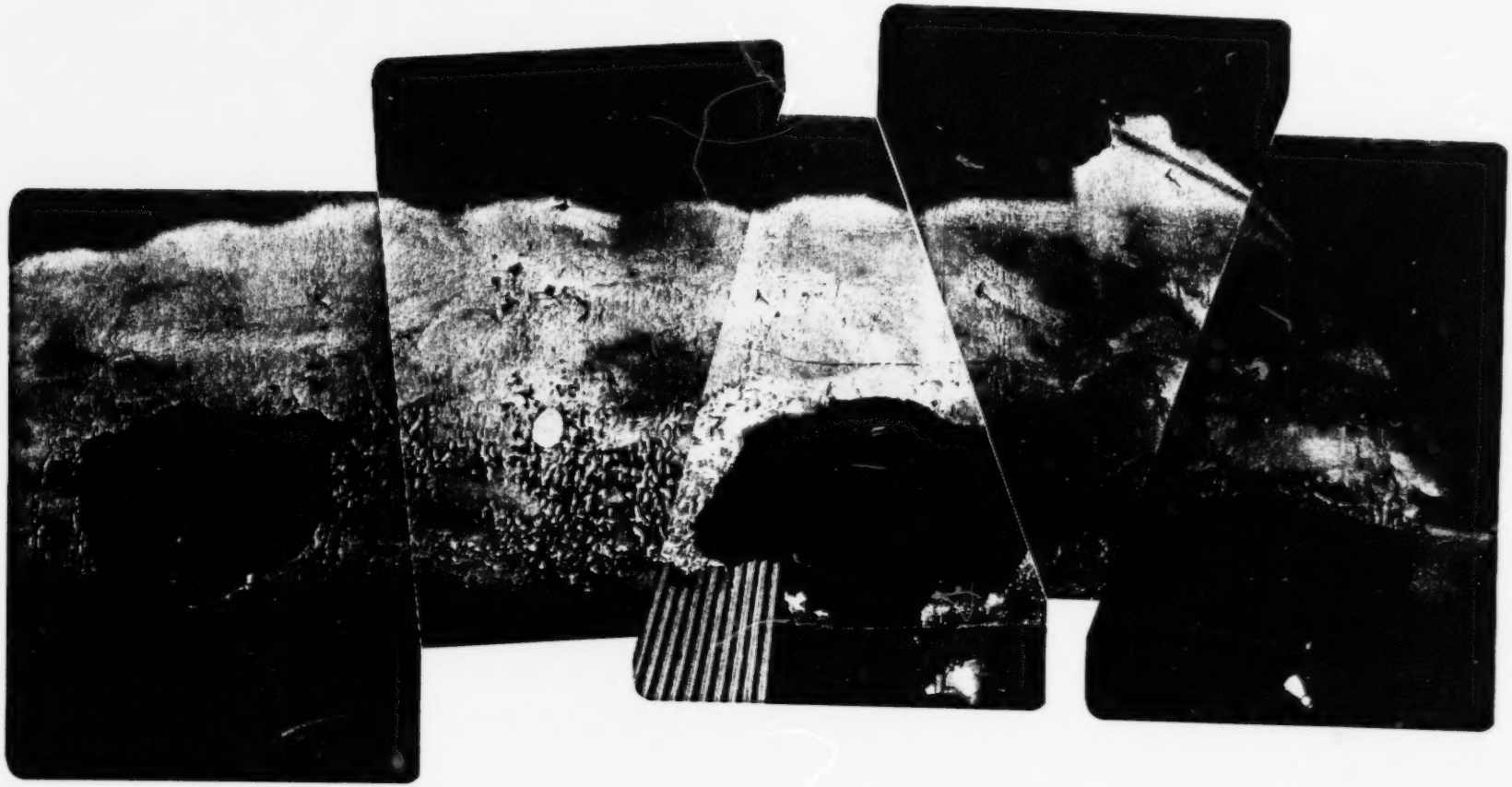
FIGURE 7

CANNON SIZE Ø 0.3 M X 3.6 M
AIR VOLUME SUPPLIED = 10 M^3/H (STANDARD AIR)

5

Ø 0.3 M X 5.8 M LONG
10 M^3/H (STANDARD AIR)

4



3

0.3 X 5.8 M LONG
24 M^3/H (STANDARD AIR)

2

0.3 x 3.6 M LONG
22 M^3/H (STANDARD AIR)

1

0.3 X 0.6 M LONG
17 M^3/H (STANDARD AIR)

ATARA BUBBLER SYSTEM
PROJECT NO. 80-211-02

MARCH 22. 1982
ICE DETERIORATION

FIGURE 8

CANNON SIZE Ø 0.3 M X 3.6 M
AIR VOLUME SUPPLIED = 10 M^3/H (STANDARD AIR)

Ø 0.3 M X 5.8 M LONG
10 M^3/H (STANDARD AIR)

0.3 X 5.8 M LONG
24 M^3/H (STANDARD AIR)

0.3 x 3.6 M LONG
22 M^3/H (STANDARD AIR)

0.3 X 0.6 M LONG
17 M^3/H (STANDARD AIR)

ATARA BUBBLER SYSTEM
PROJECT NO. 80-211-02

MARCH 29, 1982
ICE DETERIORATION

FIGURE 9

The photographs show that cannons #1, #2 and #3 (17, 22, 24 m^3/h - standard air respectively) performed very well.

It was observed from both photographs and the observations during the ice metering that the perimeter of the holes remained approximately vertical as the holes expanded in size. This characteristic continued unitl close to the end of the monitoring period when the ice surrounding the open water at each bubbler began to be eroded in a tapered fashion.

As was the case with the line bubbler in the Saskatchewan Wheat Pool slip, it was noted that ice deterioration did not begin to accelerate until after March 11, 1982. This was due to an extended cold period prior to March 11, 1982. This result supports the postulate that the bubble equipment's ability to melt ice can be balanced and even exceeded by freezing produced by ambient climatic conditions.

Figure 10 shows the area of the holes estimated by field observation and verified by scaling the photographs. From these results, it is apparent the rate of hole growth is very much affected by the volume of the air used. However, the length of the air cannon barrel did not seem to have any significant effect.

Unit No.	Atara Cannon Size Dia. (m) x Length (m)	Air Volume Supplied (m^3/n Standard Air	Estimated Area of Open Water (m^2) March 6	March 11	March 15	March 18	March 22	March 29
1	0.3 x 0.6	17	3.34	27.87	34.37	41.81	62.71	88.26
2	0.3 x 3.6	22	5.20	35.3	45.52	56.67	90.58	16.26
3	0.3 x 5.8	24	.84	6.97	18.58	32.02	61.31	111.5
4	0.3 x 3.6	10	.84	1.30	3.72	6.04	9.29	23.23
5	0.3 x 5.8	10	.84	6.04	10.68	11.15	12.08	23.23

AIR CANNON BUBBLER SYSTEM

FIGURE 10

3. RESULTS

3.1 AIR CANNON PERFORMANCE

The performance of the air cannons can be analyzed by calculating the volume of ice melted during a day related to the air flow. This can be expressed by:

$$R = \frac{T \times dA}{N \times V}$$

Where R = Rate of ice deterioration; m^3/day per m^3/h (Standard Air)

T = Initial ice thickness; m.

dA = Change of area of open water; m^2

N = Number of days

V = Air volume; m^3/h (Standard Air)

Using average ice thicknesses around units #1, #2 and #3 on March 5, and the data presented in the previous section, ice deterioration rates were calculated and are summarized in Figures 11 and 12.[2]

RATE OF ICE DETERIORATION

m^3/day per m^3/h (Standard Air)

AIR CANNON	V SFM	T FT.	MARCH 6 TO MARCH 11	MARCH 11 TO MARCH 29	MARCH 6 TO MARCH 29
Unit #1 (12 in. x 2 ft.)	10	2.5	13.2	9.0	9.9
Unit #2 (12 in. x 12 ft.)	13	2.7	13.5	15.8	15.3
Unit #3 (12 in. x 19 ft.)	14	2.5	2.4	11.2	9.3

AIR CANNON BUBBLER SYSTEM FIGURE 11

Unit No.	Atara Cannon Size Dia. (m) x length (m)	Air Volume Supplied (m^3/h standard air)	Ice Thickness T (m)	Rate of Deterioration (m^3/day) per m^3/h (Standard Air) Supplied March 6	March 11	March 6
1	0.3 x 0.6	17	0.76	0.22	0.15	0.17
2	0.3 x 3.6	22	0.82	0.22	0.26	0.26
3	0.3 x 5.8	24	0.76	0.04	0.18	0.15

AIR CANNON BUBBLER SYSTEM FIGURE 12

In comparison to the air cannons, the line bubbler system performance can be analyzed on a similar basis using the relation of ice melted during a day to a related air flow. The line bubbler system performance can be expressed by:

$$R = \frac{(T \times A) + U}{N \times V}$$

Where R = Rate of ice deterioration; m^3/day/(m^3/h) standard air

T = Initial ice thickness; m.

A = Area of open water; m^2/m (diffuser line)

U = Volume of ice melted due to sloping sides around open water; m^3/m (diffuser line)

N = Number of days

V = Air volume; $m^3/h/m$ (diffuser line)

Using the data from the line bubbler system in the slip beside Saskatchewan Wheat Pool Grain Elevator No. 7A for the same period March 6 to March 29, 1982:

T = .43 m (from thickness measurements March 5)

A = 4.18 m^2/.3048m
= 13.71 m^2/m - diffuser line

U = .43m x 6.6m (estimated) x .3048m
= 2.62 m^3/m - diffuser line

N = 23 days
V = (127 m^3/h) 293m
= (.43 m^3/h)/m - diffuser line

Therefore: $$R = \frac{(.43 \times 13.72) + 2.62}{23 \times 43}$$

= .86 m^3/day per m^3/h standard air

compared to .26 m^3/day per m^3/h standard air

Based on this performance criteria, it is concluded that the Air Cannons, in the configurations they were installed during this test period, were less effective than the line bubbler system.

* * * * * * * * * * *

In terms of power consumed, the Air Cannons required significantly less power.

The line bubler compressors produced 510 m^3/hr. (300 SCFM) and required 60 KW (80 HP) or 8.5 m^3/hr./KW (3.75 SCFM/HP).

The Air Cannon blower produced 85 M^3/hr. (50 SCFM) and required 5.6 KW (7½ HP) or 15.2 m^3/hr./KW (6.67 SCFM/HP).

Based on the above, it is concluded that the line bubbler is less power efficient than the Air Cannons.

4. DISCUSSION

Throughout the test period, it was noted that the equipment ran well, required little maintenance and was easy to install and remove. This ease of installation of the cannons through the ice and their removal from the wharf are a distinct advantage over the line bubbler system. This is particularly evident in the centre of the slip where the fixed line bubbler is very susceptible to damage from propeller wash or anchors during the shipping system.

The significant characteristic of the air cannon system is the almost vertical ice edges around the open water holes. It is our opinion that the starting open hole directly above the air cannon discharge caused heat to be lost up through the open water. This is supported by G. P. William's paper, "Thermal Regime of Lakes and Rivers with Reference to Air Bubbling Systems", in which the range of heat losses to atmosphere from open water is postulated to vary between 72 to 102 KJ/m² Hr. °C (3.5 to 5.0 BTU/ft.² Hr. °F).

Application of this postulate to #2 Cannon on March 11, 1982 demonstrated that approximately 42% of the thermal potential of the air cannon was lost due to this effect.

The (approximately) vertical edges of the open water holes are most likely the result of the flow impinging on the edges instead of on the underside of the ice cover.

In contrast, the edges around the open water of the line bubbler system were tapered at a shallow angle under the ice, so that the ice beside the open water was melted on the underside. This of course contributes to the effectiveness of the line bubbler system.

This suggests that the performance of the air cannon could be improved by locating the unit on the bottom of the slip at some horizontal distance away from the initial installation hole. Also, it may be helpful to put the ice blocks back into the hole and thereby effect an ice cover.

General weather data which formed the basis for some of the above discussion is presented in Appendix A.

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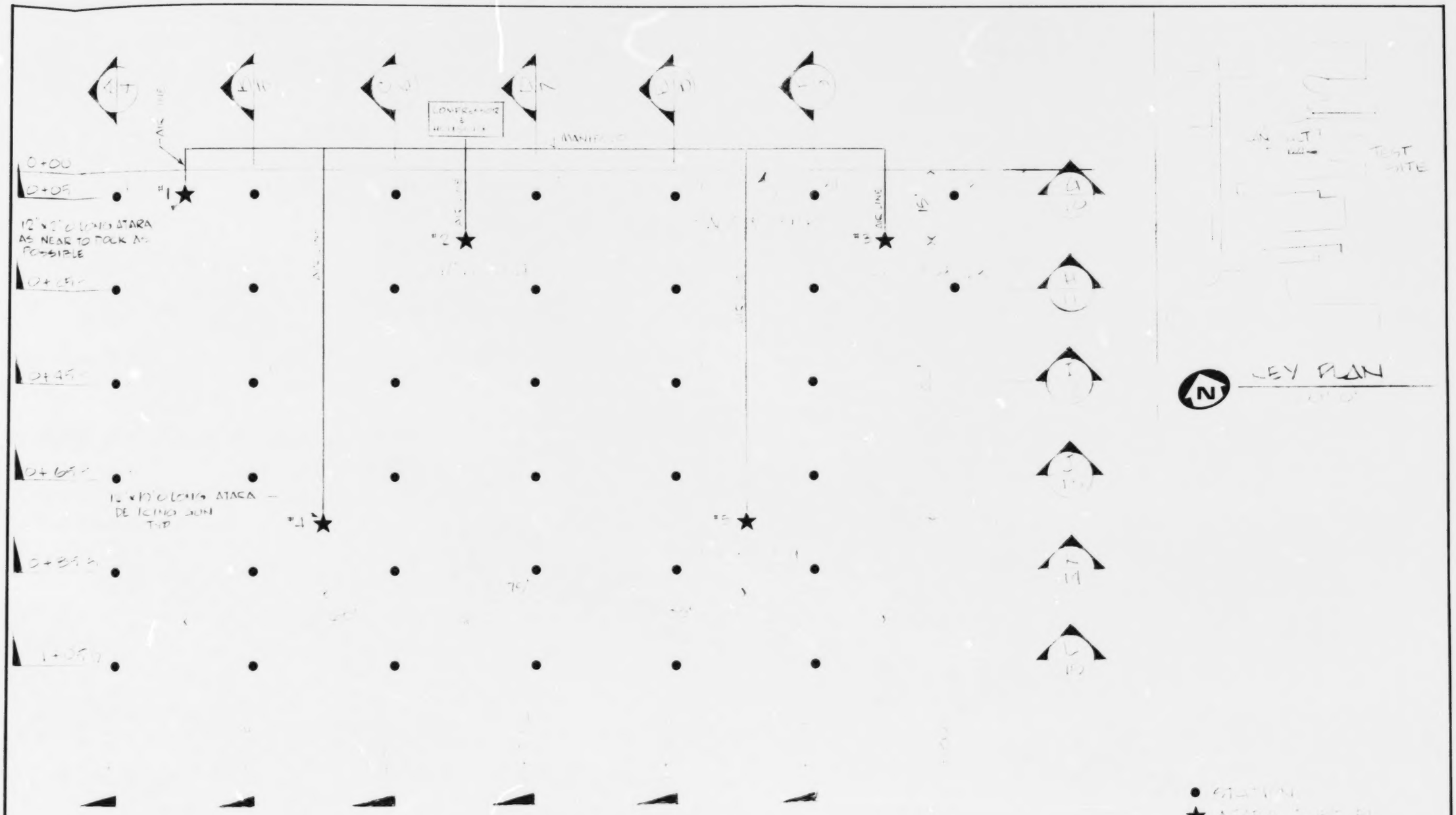

VB COOK CO. LIMITED
CONSULTING ENGINEERS
THUNDER BAY, ONTARIO

DRN	CHKD	SCALE	DWG Nº
APP	DATE	PROJ Nº	501

TEST HOLE DATA - ICE THICKNESS

TEST DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	UTL. STA	WATER TUNNEL
MAR 4/82	34	29	24	30	25	35	42	26	21	32	30½	45	34	33	26	36	45	32																				
MAR 5/82																			1/4	0	1½	1	26	31	26	5½	6	10½	33	23	34	35½	43½	-	-	13	32	25½		
MAR 6/82	35½	31	34																																			
MAR 9/82	39																																					
MAR 11/82																																						
MAR 15 82																																						
MAR 17 82																																						

VB COOK CO. LIMITED
CONSULTING ENGINEERS
THUNDER BAY, ONTARIO

DRN | CHKD | SCALE | DWG Nº 502
APP | DATE | PROJ Nº

APPENDIX A

GENERAL WEATHER DATA

OCTOBER 1981 TO MARCH 1982

CLIMATIC CONDITIONS

From meteorlogical data from the Thunder Bay Airport published by Environment Canada, the Freezing Degree Days (FDD) below 0°C and the Thawing Degree Days (TDD) above 0°C were calculated and are summarized as follows:

MONTH	DAYS	FDD	TDD	CUMULATIVE TOTAL
October	31	- 18	+147	+ 129
November	30	- 41	+ 64	+ 23
December	31	- 284	0	- 284
January	31	- 640	0	- 640
February	28	- 365	+ 1	- 364
March	31	- 192	+ 10	- 182
TOTALS		-1540	+222	-1318

The daily FDD and TDD calculated from Environment Canada are tabulated on the next page.

MONTHLY SUMMARY

Freezing Degree Days (FDD) below 0°C and Thawing Degree Days (TDD) above 0°C calculated from hourly temperature readings by Environment Canada at Thunder Bay Airport

Thunder Bay Winter Season 1981/82

DAY	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH
1	+ 1.4	+ 6.1	- .7	-24.6	-15.6	- 8.0
2	+ 2.3	+ 4.4	- .6	-12.5	-13.1	-13.8
3	+ 4.1	+ 5.2	- 2.3	-11.7	-24.5	-16.4
4	+ 7.8	+ 3.2	- 3.8	-17.2	-25.5	-11.9
5	+ 8.7	+ 4.9	- 6.3	-15.9	-26.1	-10.5
6	+ 7.6	+ .7	- 2.6	-21.1	-23.2	- 9.1
7	+ 5.9	+ .8	- 1.5	-23.8	-15.2	-17.7
8	+ 5.1	+ .8	- 5.9	-27.1	-19.0	-19.3
9	+ 8.0	- 2.1	-11.6	-31.7	-22.5	-15.7
10	+ 8.0	+ 1.1	-13.0	-27.9	-20.3	- 5.9
11	+ 8.2	- 1.3	-11.6	-15.8	-14.1	- 6.5
12	+ 8.9	+ 5.4	- 2.5	-21.5	-18.3	- 4.5
13	+10.5	+ 5.0	- 2.9	-24.4	-18.1	- 1.3
14	+10.4	+ 6.9	- 7.3	-14.3	-16.0	- 2.9
15	+ 5.9	+ 7.0	-10.0	-13.7	- 3.5	- .1
16	+ 6.6	+ 6.8	-13.0	-30.9	- 9.4	+ .4
17	+ 8.6	+ 3.4	-17.0	-32.4	- 4.8	+ 1.2
18	+ 1.4	- .1	-12.7	-28.8	+ 0.0	- 1.4
19	- 1.3	- 3.2	-17.6	-14.4	+ 0.8	- 8.0
20	+ .7	- 4.4	-11.5	-25.2	+ 0.5	- 4.6
21	- 3.3	- 6.3	- 1.5	-24.7	- 3.7	+ .7
22	- 2.2	- 9.0	- 2.7	-19.2	- 1.8	- 1.9
23	- 4.7	- 5.2	- 8.5	-16.3	-11.3	- 1.7
24	- 2.1	- 2.7	-15.8	-24.5	-11.2	+ .5
25	- 1.1	+ .3	-14.6	-22.4	-15.5	- 5.4
26	- 3.5	+ 1.7	-16.2	-21.1	- 8.2	-11.1
27	+ 2.8	- .7	- 2.5	- 4.0	-13.9	-11.3
28	+ .3	- 2.8	-12.1	-13.2	-10.3	- 3.2
29	+ 5.9	- 1.7	-18.4	-17.0		+ 2.9
30	+ 7.8	- 1.3	-22.6	-17.6		+ 2.0
31	+10.8		-14.6	-25.0		+ 2.4
TOTAL						
FDD	-18.2	-40.8	-283.9	-639.9	-365.1	-192.2
TDD	+147.7	+63.7	0	0	+ 01.3	+ 10.1

DRY-BULB TEMPERATURE SUMMARY*
SOMMAIRE DES TEMPÉRATURES DU THERMOMÈTRE SEC*

MONTH / MOIS: OCTOBER / OCTOBRE 1961

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.6	2.3	1.5	0.9	0.5	1.1	1.3	0.8	0.6	0.7	0.7	0.9	1.5	2.0	2.9	3.3	3.7	3.2	2.9	1.2	0.3	0.1	-0.3	-2.8
2	-1.5	-1.3	-1.9	-2.4	-3.3	-4.4	-4.7	-3.3	-2.6	0.3	2.1	4.3	6.8	8.2	9.5	10.7	10.8	10.3	8.7	5.4	0.2	-0.3	-0.5	-0.8
3	-1.5	-0.5	-2.3	-0.9	-0.8	-2.3	-2.1	-3.7	-2.2	0.8	6.6	8.2	9.2	9.5	11.0	10.6	9.6	8.4	7.5	7.1	6.8	6.6	6.5	6.9
4	6.9	7.0	7.2	7.3	7.0	7.2	7.1	7.4	7.9	7.9	8.6	8.1	8.6	8.4	8.2	8.1	7.9	8.1	8.0	8.1	8.0	7.9	7.6	7.4
5	7.2	7.0	6.8	6.6	6.2	5.2	5.5	6.3	6.5	8.0	9.0	9.9	10.8	11.2	12.6	12.7	12.2	10.8	9.7	9.5	9.1	9.1	9.0	8.8
6	8.8	8.2	7.8	7.8	7.8	7.9	8.3	7.9	6.7	6.4	6.8	7.7	7.3	9.4	9.5	9.1	9.2	9.0	8.2	7.3	6.6	6.1	5.1	3.9
7	4.2	3.1	2.8	2.1	0.9	0.5	0.3	-0.4	1.7	4.1	6.6	9.8	11.1	12.3	13.3	13.7	13.6	13.3	11.1	7.8	4.6	2.0	1.7	1.2
8	2.2	-0.1	-0.3	-0.3	0.7	0.7	1.7	1.6	2.3	3.4	7.5	8.8	9.2	8.9	8.7	8.6	8.2	8.1	7.8	7.5	6.9	6.6	6.6	7.2
9	7.1	7.3	7.2	6.8	6.7	6.4	6.5	6.6	7.1	8.2	8.9	9.1	9.9	10.8	10.9	9.3	8.9	8.2	7.6	7.4	7.4	7.4	7.4	7.6
10	7.4	7.6	7.8	7.6	7.6	7.6	7.7	7.7	7.8	7.7	7.9	7.9	8.2	8.2	8.3	8.5	8.4	8.3	8.3	8.3	8.1	8.1	8.1	8.3
11	8.4	8.3	8.1	8.3	8.1	8.1	8.0	8.4	8.5	8.3	8.3	8.7	8.5	8.8	8.5	8.7	9.0	8.8	8.5	8.1	6.8	6.7	6.8	6.9
12	7.0	7.0	6.9	6.4	6.6	6.6	7.1	7.1	7.5	8.2	10.2	10.7	12.1	12.2	11.9	11.9	11.4	10.8	9.6	8.9	8.4	8.0	7.8	9.4
13	10.5	11.1	9.9	9.2	9.9	10.2	10.4	10.3	10.0	11.3	12.2	11.9	13.5	12.2	12.9	12.6	11.0	11.2	10.4	10.4	10.1	9.9	10.0	10.1
14	10.6	10.7	10.7	10.7	11.0	11.1	11.1	11.0	11.0	11.1	10.9	11.4	11.5	11.5	11.4	11.5	11.4	10.5	9.5	9.0	8.9	7.8	7.5	8.0
15	8.0	7.3	5.7	3.1	1.1	2.2	3.1	4.0	4.0	5.1	6.5	7.2	7.9	8.4	9.6	9.7	10.4	10.3	8.2	5.8	3.8	3.9	4.0	1.2
16	1.0	1.6	1.3	1.1	1.1	-1.1	0.2	0.4	1.8	2.8	4.8	8.1	10.7	12.0	13.9	14.4	14.5	13.2	12.3	9.7	8.6	7.1	7.6	12.0
17	11.6	11.6	9.9	5.3	5.2	5.2	6.6	6.8	7.0	9.1	9.0	9.2	9.2	9.5	9.4	9.0	9.4	9.8	9.8	9.1	8.8	8.7	8.7	7.7
18	8.6	8.9	6.2	3.6	2.9	2.7	2.6	2.4	1.7	1.5	1.6	1.4	2.0	1.1	0.9	-0.8	-0.5	-1.1	-1.7	-1.8	-2.1	-2.3	-2.3	-2.5
19	-2.5	-3.4	-5.1	-4.7	-7.0	-7.8	-8.0	-7.3	-5.6	-3.3	-1.0	-1.4	-1.3	0.8	2.4	3.8	4.6	4.8	4.0	1.8	1.0	1.5	0.6	2.4
20	1.7	1.5	1.9	0.9	0.4	0.5	0.7	0.6	0.4	0.6	0.9	2.2	4.0	2.4	3.0	3.1	1.5	0.2	0.0	-0.3	-1.4	-2.0	-3.2	-4.1
21	-4.9	-4.9	-5.0	-4.9	-5.0	-5.0	-5.1	-5.1	-5.0	-4.6	-4.1	-4.1	-3.2	-1.5	-1.2	-0.8	-0.6	-0.5	-1.8	-2.1	-2.7	-2.3	-2.5	-2.4
22	-2.8	-2.8	-2.7	-2.7	-2.7	-2.7	-4.1	-5.0	-3.6	-3.3	-3.3	-2.2	-0.7	1.0	0.5	-0.6	-1.1	-1.1	-1.4	-1.4	-1.7	-2.5	-2.5	-2.5
23	-3.5	-3.9	-4.5	-6.0	-6.4	-6.7	-7.0	-8.3	-9.3	-6.5	-4.4	-3.7	-3.3	-2.6	-2.0	-2.6	-2.0	-2.9	-3.5	-5.0	-4.8	-4.0	-4.3	-4.4
24	-4.5	-4.9	-6.7	-7.5	-6.5	-6.0	-5.5	-4.2	-4.3	-2.5	-1.1	-0.4	0.1	0.7	0.7	0.7	0.2	0.0	0.4	0.0	0.0	0.2	0.6	1.1
25	1.2	0.5	0.8	0.8	0.7	-0.1	0.1	-0.2	-0.4	-0.2	-0.2	-0.7	-0.5	0.1	0.1	-0.3	-0.4	-0.8	-1.5	-2.3	-3.9	-4.6	-5.2	-8.9
26	-9.8	-9.6	-11.5	-11.2	-11.4	-13.1	-12.7	-13.0	-12.2	-9.7	-7.1	-3.3	2.2	2.6	2.8	4.3	4.1	4.5	3.8	3.3	4.0	5.2	3.4	1.8
27	5.2	4.9	1.9	0.5	-0.4	-0.4	-3.0	-0.9	-2.6	3.3	5.6	7.4	7.8	7.5	7.6	6.9	6.2	5.2	3.5	2.0	0.6	-0.6	-1.3	-1.0
28	-2.7	-3.4	-5.3	-3.8	-2.5	-2.1	-2.0	-1.7	-1.2	-0.2	1.2	1.8	1.7	1.7	1.3	1.8	1.6	1.4	1.6	2.0	2.7	4.2	4.5	4.7
29	4.8	4.8	4.9	4.9	5.1	4.7	4.5	4.3	4.8	5.3	6.6	6.5	6.7	6.9	7.8	8.0	7.6	6.6	5.9	5.9	6.2	6.1	6.1	6.3
30	6.0	5.9	5.8	6.3	6.4	6.2	6.5	6.8	6.9	7.1	7.3	8.0	9.1	9.1	9.7	9.1	8.5	8.0	7.9	8.0	8.2	8.8	9.2	11.6
31	13.2	13.0	13.0	13.0	11.7	12.1	9.6	7.2	8.9	10.3	11.3	12.8	13.3	13.1	13.0	13.1	11.4	10.9	10.2	9.6	8.9	7.1	7.1	6.3

*Temperatures in tenths of degrees Celsius – Températures en dixième de degrés Celsius

DEWPOINT TEMPERATURE SUMMARY - SOMMAIRE DES TEMPERATURES DU POINT DE ROSEE

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	1.2	0.7	0.1	-0.4	-0.7	-0.6	-0.2	-0.7	-1.1	-1.8	-1.0	-0.9	-0.7	-1.1	-1.3	-1.4	-1.1	-2.5	-1.7	-3.3	-3.5	-2.7	-3.2	-5.3
2	-3.8	-3.5	-4.9	-5.2	-5.6	-6.3	-7.2	-5.9	-5.1	-3.8	-2.6	-1.9	-2.4	-5.4	-4.0	-3.9	-3.6	-3.8	-1.9	0.3	-2.8	-3.3	-2.8	-3.5
3	-3.9	-2.6	-4.3	-2.7	-2.7	-4.3	-3.6	-5.8	-4.3	-1.7	0.3	-3.7	-1.7	-3.5	-4.6	-5.4	-2.1	-0.4	1.8	2.1	0.6	-0.1	0.8	1.5
4	2.3	2.8	3.0	3.6	4.0	4.3	4.4	4.1	4.4	4.9	5.4	5.7	5.6	5.8	5.8	6.2	6.5	6.7	6.7	6.5	6.5	6.5	6.5	6.3
5	6.2	5.9	5.6	5.4	5.0	4.0	4.5	4.7	4.9	6.0	6.4	6.7	6.3	6.8	5.9	5.8	6.2	7.9	7.8	7.8	7.9	8.0	7.5	7.3
6	7.2	7.1	6.8	6.8	6.8	6.6	6.0	5.6	3.5	3.4	1.7	1.6	1.8	1.4	1.5	0.8	0.7	2.1	1.4	1.2	0.9	0.6	0.4	0.3
7	0.5	-0.2	-0.4	-1.0	-1.9	-2.0	-2.2	-2.9	-1.8	-0.7	0.4	-1.1	-1.8	-3.2	-2.4	-2.1	-3.1	-2.7	-0.9	-0.5	-0.1	-1.6	-1.4	-1.9
8	-0.9	-2.7	-2.6	-2.4	-1.7	-1.5	-1.2	-0.8	-0.5	0.6	2.7	3.7	2.9	4.3	2.9	2.9	3.0	3.0	3.0	3.2	3.3	4.0	4.2	2.6
9	2.3	3.1	2.7	2.1	2.3	2.5	2.6	2.8	3.3	2.7	3.1	3.0	4.2	4.7	4.7	4.9	4.7	4.5	4.3	4.0	3.8	3.3	2.7	2.2
10	3.1	3.5	4.0	4.1	4.2	4.2	4.4	4.7	5.0	5.9	5.8	6.1	5.9	6.0	6.3	6.4	6.8	6.7	6.8	6.8	6.8	6.8	7.0	7.0
11	7.2	7.2	7.0	7.1	7.1	7.0	6.9	7.4	7.4	7.2	7.1	7.2	7.2	7.3	7.2	7.2	7.1	6.7	6.4	6.2	5.6	5.5	5.2	4.9
12	5.4	5.2	5.1	4.4	4.7	4.8	5.3	4.3	5.2	5.8	4.7	6.0	5.3	4.8	4.7	5.5	6.1	6.2	6.0	5.6	5.0	4.6	4.6	4.4
13	4.6	4.7	4.1	4.8	3.8	2.8	3.9	4.0	4.5	4.9	5.0	6.1	6.0	7.0	6.2	7.8	8.7	9.4	9.0	9.0	8.7	8.6	8.6	8.8
14	9.2	9.4	9.6	9.7	9.9	9.9	9.8	9.6	9.5	9.6	9.4	9.5	9.6	9.4	8.3	7.7	6.8	6.0	4.7	3.8	3.4	3.5	3.1	3.0
15	3.1	2.4	0.6	-0.5	-1.9	-0.8	0.4	0.9	1.2	1.6	2.1	2.2	2.3	2.3	2.1	1.0	0.6	0.3	-0.5	-1.1	-1.1	0.4	0.3	-1.2
16	-1.5	-1.2	-1.2	-1.1	-1.5	-2.7	-2.1	-1.8	-0.8	0.5	1.9	3.9	4.1	4.9	5.6	5.3	4.9	4.8	4.5	4.2	4.4	3.6	3.2	3.5
17	3.2	3.1	3.0	1.9	1.9	2.6	4.7	5.1	5.4	6.7	6.4	6.7	6.9	7.3	8.0	7.4	7.9	7.8	7.9	7.7	7.5	7.4	7.5	6.3
18	7.0	6.9	3.0	0.4	-0.9	-1.4	-2.2	-3.2	-4.5	-5.1	-5.1	-5.4	-6.3	-7.0	-7.3	-9.4	-10.5	-10.8	-9.6	-10.3	-10.0	-9.8	-9.8	-10.7
19	-10.6	-10.1	-10.2	-9.8	-11.0	-11.2	-11.1	-10.4	-9.0	-7.0	-5.8	-4.1	-3.5	-1.8	-2.4	-1.7	-1.3	-1.3	-1.0	-1.3	-1.4	-1.3	-1.9	-1.3
20	-1.1	-0.8	-1.0	-1.1	-1.1	-1.4	-1.9	-2.5	-2.0	-2.7	-2.0	-1.9	-1.7	-1.2	-1.9	-3.2	-4.2	-5.4	-5.9	-6.6	-7.5	-9.4	-9.6	-11.7
21	-12.5	-12.5	-12.3	-12.5	-12.7	-13.2	-12.2	-12.5	-12.5	-13.5	-13.2	-12.8	-13.0	-12.0	-12.3	-11.8	-11.4	-9.4	-9.7	-9.0	-8.3	-7.9	-7.3	-6.9
22	-6.7	-5.8	-4.6	-4.6	-4.8	-4.7	-5.9	-7.3	-5.4	-5.3	-5.1	-4.6	-4.9	-6.9	-5.9	-3.4	-3.7	-3.9	-3.5	-3.7	-4.3	-5.1	-6.0	-7.0
23	-7.6	-7.6	-8.2	-9.3	-9.9	-10.5	-11.0	-11.7	-12.6	-11.0	-10.1	-10.6	-11.0	-11.6	-10.8	-10.9	-11.0	-11.5	-11.4	-11.6	-11.3	-10.9	-10.5	-10.4
24	-10.7	-9.4	-10.1	-11.0	-10.1	-9.6	-9.3	-9.8	-8.5	-8.0	-8.2	-7.3	-6.8	-5.7	-4.4	-2.9	-2.8	-3.4	-3.5	-2.7	-2.7	-2.7	-2.9	-2.6
25	-2.7	-2.4	-2.8	-3.2	-3.2	-2.8	-2.1	-2.3	-3.4	-4.4	-4.7	-6.4	-6.6	-7.3	-8.2	-9.1	-8.9	-9.9	-9.2	-9.8	-10.6	-11.0	-11.0	-12.
26	-13.2	-13.7	-14.7	-14.0	-14.6	-16.2	-16.0	-16.4	-15.2	-13.0	-10.8	-8.5	-5.7	-5.3	-4.5	-3.9	-3.4	-2.7	-2.7	-2.7	-2.2	-1.2	-1.9	-2.2
27	-1.8	-2.1	-2.4	-3.4	-3.8	-4.2	-5.8	-4.0	-5.9	-1.1	-0.4	-0.9	-1.1	-1.9	-1.9	-2.5	-2.7	-2.5	-3.5	-4.2	-5.0	-5.5	-5.8	-5.8
28	-6.7	-7.0	-9.1	-7.1	-6.2	-5.8	-5.7	-5.4	-4.7	-3.9	-2.8	-2.7	-3.1	-3.1	-3.5	-3.1	-2.3	-1.9	-1.7	-1.0	-0.2	0.7	1.4	1.8
29	2.0	2.0	2.1	2.4	2.8	2.1	1.8	1.8	2.3	2.6	3.4	3.2	3.5	3.7	4.2	4.4	4.2	3.8	3.5	3.5	3.6	3.3	3.1	3.1
30	3.1	3.0	2.7	3.0	2.7	2.9	3.1	3.6	3.9	4.3	4.3	4.7	5.0	4.7	4.7	4.4	4.0	3.9	3.9	4.3	4.6	4.5	4.9	5.7
31	7.1	6.8	7.1	8.1	8.1	8.4	3.4	2.2	1.8	2.1	2.1	1.9	1.7	2.0	2.2	2.3	1.6	1.6	1.5	1.5	1.5	1.3	1.2	1.1

DRY-BULB TEMPERATURE SUMMARY*
SOMMAIRE DES TEMPÉRATURES DU THERMOMÈTRE SEC*

MONTH / MOIS: NOVEMBER / NOVEMBRE

1981

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	3.6	2.0	3.4	1.5	0.0	-1.4	-1.2	0.2	-3.9	1.1	4.5	8.4	12.1	14.6	17.0	17.3	17.3	15.0	10.4	10.8	6.0	4.3	2.9	1.4
2	0.7	1.5	4.7	7.8	0.5	0.3	-2.0	-0.7	0.6	1.1	6.1	7.9	9.0	10.8	11.6	12.6	12.8	10.3	7.0	3.6	1.5	-0.1	-0.9	-1.7
3	-1.1	-1.4	-2.3	-2.5	-2.5	-4.1	-4.3	-4.6	-4.6	-1.2	3.5	9.3	14.1	16.8	17.8	17.9	17.7	15.6	12.6	9.1	6.3	7.2	4.4	1.8
4	0.2	0.0	0.5	-1.4	-1.5	0.2	-2.1	-2.5	-1.4	1.5	2.7	4.6	8.2	8.9	9.6	9.6	8.9	7.7	6.8	6.1	4.9	2.2	1.5	0.5
5	0.1	0.5	2.4	3.2	2.6	1.6	1.8	2.6	5.2	9.8	10.4	6.2	5.8	6.4	6.2	7.8	7.0	6.3	6.2	5.9	5.6	5.0	4.4	4.3
6	1.9	1.4	1.3	0.7	-0.4	-0.9	-1.8	-1.6	-4.8	-1.5	0.4	1.1	2.7	3.5	4.6	5.6	6.0	5.3	4.3	1.9	-2.7	-2.3	-4.9	-3.1
7	-3.0	-4.9	-4.9	-5.7	-5.6	-6.3	-6.5	-6.8	-6.3	-3.3	2.2	7.0	9.0	11.4	13.4	14.8	12.9	9.8	6.1	4.3	1.8	-1.3	-0.5	-0.1
8	0.6	-1.9	-2.7	-3.2	4.3	6.2	7.5	3.8	2.1	1.1	1.8	1.2	1.8	2.7	3.1	3.0	2.3	0.7	-1.4	-0.8	-2.3	-3.1	-3.7	-4.7
9	-3.4	-3.5	-3.7	-4.4	-5.5	-7.4	-6.6	-6.3	-9.1	-5.7	-3.4	-2.0	-0.3	0.5	1.0	2.2	1.2	0.3	0.0	-0.1	0.3	1.5	2.3	2.5
10	2.8	2.3	2.8	1.8	-0.5	-0.2	-0.3	-0.5	-0.4	0.1	2.8	4.8	4.8	3.4	2.7	1.6	1.1	0.5	0.0	-0.2	-0.4	-0.7	-0.9	-1.2
11	-1.4	-1.9	-3.2	-3.7	-3.3	-3.1	-3.1	-2.5	-2.3	-2.5	-2.2	-2.1	-1.2	0.1	1.5	0.5	0.7	-0.3	-0.9	-1.4	-0.5	-0.1	0.4	0.4
12	1.3	1.9	1.9	1.7	1.3	0.8	-3.6	-1.6	-3.8	-1.4	4.2	8.4	9.9	11.2	12.5	12.2	11.8	10.4	9.2	7.5	7.9	8.6	8.0	8.4
13	8.3	8.0	7.3	1.7	-1.6	-1.8	-2.9	-3.0	-2.9	-2.3	4.1	9.1	12.0	13.0	13.5	12.2	11.2	10.4	7.4	4.3	2.8	3.3	3.1	3.9
14	9.7	10.0	9.8	7.0	5.0	3.9	2.9	1.3	1.4	2.7	8.0	8.8	8.7	9.5	9.7	8.2	7.6	7.6	7.4	7.5	7.4	7.2	7.1	6.9
15	6.1	6.1	5.8	6.6	6.5	6.3	6.0	5.7	6.2	6.6	7.6	8.7	8.7	8.5	8.7	9.0	8.9	7.3	7.4	6.6	6.3	5.8	6.2	6.2
16	6.4	6.3	7.0	7.1	6.8	6.8	6.7	6.7	6.6	6.8	6.9	7.3	7.6	7.4	7.5	7.5	7.6	7.5	7.4	7.4	7.0	6.1	5.7	2.9
17	1.9	0.7	0.9	0.7	1.2	3.6	3.5	3.7	3.4	4.2	5.1	6.0	5.4	5.3	5.3	5.1	5.1	4.7	4.5	4.1	3.5	3.1	2.9	2.3
18	1.2	0.9	1.2	0.9	0.3	-0.1	0.4	-0.1	-0.7	-0.6	-0.3	-0.4	-0.1	0.4	0.3	0.1	-0.3	-0.5	-0.3	-0.6	-0.9	-0.9	-0.8	-0.9
19	-0.9	-1.1	-1.5	-1.9	-2.2	-2.7	-3.1	-3.7	-3.7	-4.0	-3.7	-3.5	-3.3	-3.4	-3.1	-3.2	-3.4	-3.8	-3.9	-4.0	-4.0	-3.9	-3.9	-3.9
20	-4.0	-4.1	-4.3	-4.5	-4.5	-4.6	-4.8	-4.9	-4.9	-4.8	-4.7	-4.5	-4.1	-3.6	-3.1	-3.1	-3.2	-3.8	-4.4	-4.5	-5.1	-5.2	-5.5	-5.7
21	-5.9	-5.8	-6.2	-6.1	-6.3	-6.7	-6.8	-6.6	-6.8	-7.0	-6.4	-5.2	-4.5	-4.1	-3.6	-3.3	-3.3	-4.8	-6.2	-9.2	-9.9	-9.9	-11.8	-13.9
22	-12.8	-12.8	-13.8	-13.3	-13.6	-12.4	-11.8	-11.6	-11.2	-10.4	-9.4	-7.1	-6.0	-4.8	-3.1	-2.1	-1.9	-2.3	-4.3	-8.0	-9.4	-11.2	-9.7	-12.3
23	-11.9	-12.6	-11.6	-11.2	-9.6	-9.0	-8.8	-9.2	-10.4	-9.8	-8.1	-5.5	-2.9	-0.3	2.1	2.8	2.2	1.9	1.6	0.2	-1.5	-3.0	-4.5	-6.0
24	-6.1	-6.1	-6.1	-6.7	-7.9	-6.6	-6.4	-5.1	-4.5	-3.9	-3.2	-2.1	-1.6	-0.6	0.1	0.4	0.3	0.4	0.3	-0.4	0.3	0.4	-0.1	0.2
25	-0.7	-0.7	-0.6	-1.1	-0.8	-1.2	-1.0	-0.7	-0.7	-0.3	-0.3	0.0	0.5	1.4	1.9	1.8	1.3	1.0	0.7	0.6	1.2	1.5	1.7	1.1
26	1.4	1.8	2.5	2.7	2.3	1.6	0.9	1.5	2.2	2.7	1.9	1.8	2.0	2.3	2.5	2.4	2.4	2.0	1.8	1.1	0.3	0.2	0.2	0.2
27	0.2	0.2	0.2	0.2	-0.2	-0.3	0.0	-0.6	-0.3	-0.2	-0.1	-0.1	-0.3	-0.2	-0.2	-0.2	-0.6	-1.0	-1.3	-1.6	-1.8	-1.9	-1.9	-2.0
28	-2.6	-3.1	-3.4	-4.2	-3.6	-3.4	-3.6	-4.1	-4.8	-4.9	-3.7	-3.6	-2.7	-1.9	-1.9	-1.3	-1.3	-1.5	-2.3	-1.4	-1.6	-1.6	-1.5	-2
29	-2.1	-2.1	-2.8	-3.3	-3.4	-3.2	-3.1	-3.0	-3.1	-3.0	-2.6	-2.0	-1.9	-1.4	-1.0	-0.6	-1.3	-0.4	-0.2	-0.3	-0.5	0.1	0.2	0
30	0.0	-0.7	0.1	-0.6	-1.7	-1.4	-1.9	-2.1	-2.1	-2.8	-2.1	-1.7	-0.7	0.1	0.7	2.4	2.6	0.8	-0.1	-2.5	-3.0	-3.9	-4.5	-6.4

*Temperatures in tenths of degrees Celsius – Températures en dixième de degrés Celsius

DEWPOINT TEMPERATURE SUMMARY – SOMMAIRE DES TEMPÉRATURES DU POINT DE ROSÉE

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-0.3	-1.6	-0.2	-1.8	-2.8	-4.3	-3.8	-2.7	-6.6	-1.5	0.5	1.6	1.1	0.4	-1.7	-3.3	-4.0	-3.2	-3.6	-3.8	-4.5	-4.5	-4.9	-4.9
2	-4.3	-4.5	-3.1	-1.9	-4.3	-4.1	-5.9	-4.7	-3.5	-3.2	-1.7	-3.1	-3.7	-5.1	-6.0	-5.8	-5.8	-4.7	-2.3	-3.7	-4.1	-5.8	-5.8	-6.5
3	-6.2	-6.3	-6.8	-6.8	-7.2	-8.2	-8.0	-8.5	-8.1	-5.7	-3.7	-1.1	0.7	1.5	1.7	1.8	2.0	2.0	1.2	0.3	-0.1	-0.4	-1.1	-3.1
4	-3.9	-3.2	-3.0	-5.1	-4.7	-2.9	-5.6	-5.2	-4.3	-2.2	-1.1	0.3	3.1	3.3	3.6	3.7	3.6	3.5	3.0	2.7	1.9	-0.3	-1.3	-1.9
5	-2.8	-1.9	0.2	1.2	0.3	-0.6	-0.6	0.2	2.6	5.6	5.6	1.4	-0.7	-1.2	-2.2	-2.0	-3.4	-3.2	-3.0	-3.3	-4.3	-3.6	-3.5	-5.2
6	-8.6	-9.1	-8.2	-8.5	-8.5	-8.0	-8.6	-8.6	-9.8	-7.6	-7.3	-7.2	-7.2	-7.9	-8.0	-7.8	-8.1	-8.2	-9.0	-7.9	-9.2	-8.9	-10.1	-8.5
7	-8.2	-9.5	-9.3	-10.0	-9.6	-10.1	-10.3	-10.2	-10.1	-7.4	-3.0	-1.4	-0.9	-0.4	-0.4	-0.1	0.8	1.2	0.8	0.3	-0.9	-5.0	-3.5	-3.5
8	-2.7	-5.3	-6.3	-7.0	-2.3	-0.7	-0.9	-6.3	-12.7	-11.4	-10.8	-11.8	-12.1	-12.7	-13.0	-13.2	-13.5	-14.1	-13.8	-14.5	-13.8	-13.8	-13.7	-13.3
9	-12.3	-12.7	-12.6	-13.4	-14.3	-15.0	-14.6	-14.6	-15.3	-12.8	-11.2	-11.9	-14.2	-14.1	-13.8	-14.0	-11.2	-11.4	-11.7	-11.6	-10.1	-10.1	-9.8	-10.3
10	-9.5	-8.3	-8.9	-6.9	-3.7	-4.3	-4.6	-4.3	-4.3	-3.5	-4.4	-2.5	-2.2	-1.5	-4.3	-5.7	-6.3	-6.9	-7.4	-7.4	-8.4	-9.6	-9.7	-9.9
11	-10.0	-9.8	-10.3	-10.6	-10.5	-9.5	-8.9	-9.8	-9.7	-8.7	-8.9	-7.0	-6.5	-6.4	-7.4	-7.2	-7.2	-7.3	-7.2	-6.8	-6.2	-5.8	-6.2	-4.9
12	-3.5	-2.7	-2.4	-2.4	-2.7	-2.7	-6.6	-4.2	-7.4	-4.5	-1.5	-1.9	-1.9	-1.9	-1.5	-1.9	-1.9	-2.2	-2.7	-3.4	-3.0	-3.1	-2.5	-2.2
13	-2.0	-2.0	-2.0	-4.7	-6.6	-5.8	-7.1	-7.1	-6.5	-6.5	-0.8	0.9	1.8	1.9	1.8	1.3	0.6	0.4	0.2	-1.1	-1.0	-0.4	-0.7	-0.9
14	0.9	0.9	0.8	0.1	-0.4	-0.7	-1.1	-1.9	-1.9	-0.7	1.5	1.3	1.7	2.0	1.3	1.2	1.1	1.5	1.5	1.5	1.6	1.6	1.8	1.3
15	1.5	1.5	1.4	2.2	2.2	1.8	1.9	1.7	2.1	2.1	2.3	2.2	2.2	1.9	2.2	1.7	1.6	1.7	2.3	1.8	1.8	3.5	3.6	3.2
16	3.2	3.4	3.1	3.5	3.5	3.8	3.4	3.2	2.9	3.0	3.1	3.5	3.8	3.6	3.8	4.0	4.4	3.3	4.1	4.1	2.6	1.1	0.6	-1.3
17	-2.0	-3.3	-2.3	-2.7	-2.0	-0.4	-0.4	-0.3	-0.5	-0.2	0.1	0.1	-0.5	-1.0	-1.1	-1.5	-1.5	-1.9	-1.8	-2.4	-2.9	-3.8	-4.3	-5.4
18	-6.1	-5.7	-6.6	-7.1	-7.5	-7.3	-8.2	-8.0	-7.8	-7.5	-7.3	-7.9	-8.0	-7.4	-7.8	-8.0	-8.1	-8.0	-8.0	-8.4	-7.9	-7.0	-7.2	-7.9
19	-6.9	-7.2	-7.3	-7.9	-8.0	-8.3	-9.2	-9.4	-9.6	-9.4	-9.8	-9.7	-9.5	-9.7	-10.2	-10.5	-10.7	-11.0	-11.0	-10.8	-10.7	-10.5	-10.2	-10.4
20	-10.3	-10.1	-9.8	-9.8	-9.8	-10.1	-10.5	-10.5	-11.0	-10.7	-10.7	-10.8	-10.7	-11.0	-11.4	-12.2	-12.4	-12.7	-13.2	-13.0	-13.7	-13.5	-13.2	-13.1
21	-13.1	-13.6	-13.8	-13.7	-13.5	-14.0	-13.0	-13.9	-14.1	-13.8	-13.8	-13.8	-13.7	-13.5	-13.5	-13.5	-13.3	-13.7	-14.4	-15.0	-15.2	-15.2	-16.8	-17.1
22	-16.7	-17.0	-18.1	-17.6	-17.3	-16.7	-16.2	-16.0	-15.6	-14.8	-14.0	-12.5	-11.7	-11.8	-11.8	-12.6	-13.2	-12.9	-12.0	-14.1	-14.6	-16.1	-14.4	-16.2
23	-15.9	-16.7	-16.4	-15.2	-13.1	-13.4	-12.9	-13.2	-14.7	-14.1	-12.7	-10.1	-8.1	-6.4	-5.8	-6.6	-5.7	-5.1	-4.9	-5.4	-6.1	-7.1	-8.2	-9.1
24	-9.5	-9.8	-9.6	-10.0	-12.1	-10.7	-10.5	-9.1	-8.5	-8.1	-7.1	-5.6	-5.2	-4.7	-4.1	-4.0	-3.7	-3.8	-3.6	-4.2	-4.1	-4.1	-4.7	-5
25	-4.9	-4.9	-4.9	-4.8	-4.8	-4.9	-4.7	-4.7	-4.8	-4.8	-4.2	-3.5	-2.8	-2.0	-1.8	-1.9	-2.0	-2.4	-2.6	-2.6	-2.0	-1.8	-2.2	-2
26	-2.0	-1.6	-1.7	-1.9	-2.4	-2.0	-2.6	-2.0	-2.4	-2.7	-2.1	-2.0	-1.9	-1.6	-1.6	-1.6	-1.6	-1.7	-1.6	-2.4	-2.6	-2.9	-2.9	-2.1
27	-2.9	-2.9	-2.9	-3.0	-3.1	-3.3	-4.2	-4.4	-4.3	-5.1	-5.7	-5.8	-6.0	-6.2	-6.2	-6.9	-6.9	-7.3	-7.3	-7.6	-7.6	-7.9	-7.6	-7.1
28	-8.5	-8.8	-8.9	-9.6	-9.1	-9.3	-9.5	-10.0	-10.3	-10.6	-10.4	-9.6	-9.6	-8.9	-8.6	-7.9	-7.9	-7.9	-7.9	-8.6	-8.9	-8.7	-8.1	-8.1
29	-8.6	-8.8	-8.8	-9.0	-9.4	-9.1	-9.0	-9.2	-9.0	-8.6	-8.5	-8.2	-8.0	-7.9	-7.6	-7.4	-7.7	-6.4	-6.6	-7.1	-7.1	-7.1	-6.6	-6.1
30	-6.3	-5.8	-5.8	-6.1	-7.1	-7.0	-7.1	-7.2	-7.3	-7.7	-7.3	-7.1	-6.4	-5.6	-4.6	1.0	0.6	-0.7	-1.1	-2.6	-3.1	-4.4	-5.3	-7.1

DRY-BULB TEMPERATURE SUMMARY*
SOMMAIRE DES TEMPÉRATURES DU THERMOMÈTRE SEC*

MONTH / MOIS: DECEMBER / DÉCEMBRE — 1981

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-5.8	-5.7	-5.5	-4.3	-4.0	-4.1	-1.7	-1.7	2.0	2.2	2.3	2.4	1.4	0.8	0.9	0.9	0.8	0.8	0.4	0.4	0.1	0.1	0.5	0.3
2	-0.3	-0.4	-0.7	-1.1	-0.7	-0.8	-0.5	-0.4	-1.1	-0.9	-0.4	0.0	0.1	0.0	0.1	0.2	0.0	-0.2	-0.4	-0.9	-0.9	-1.1	-1.4	-1.7
3	-1.8	-2.1	-2.4	-2.3	-2.4	-2.3	-2.3	-2.6	-2.6	-2.0	-1.9	-1.6	-1.4	-1.3	-1.5	-1.7	-1.7	-1.7	-1.9	-2.8	-2.9	-3.0	-4.1	-4.7
4	-4.9	-5.7	-4.7	-5.1	-5.1	-5.2	-5.4	-5.6	-5.2	-5.2	-5.3	-3.2	-3.2	-3.2	-2.6	-2.0	-1.8	-1.7	-2.3	-2.8	-2.8	-2.8	-2.6	-2.5
5	-2.2	-2.6	-3.6	-6.3	-9.2	-10.6	-9.4	-8.2	-6.6	-6.5	-6.3	-5.5	-4.9	-4.3	-3.1	-2.7	-2.5	-2.3	-3.9	-7.8	-10.1	-10.6	-11.0	-11.2
6	-11.8	-10.2	-9.3	-8.9	-8.0	-7.3	-6.6	-5.4	-3.6	-0.7	0.1	0.6	1.0	1.1	1.2	1.1	0.9	0.5	0.9	0.8	0.2	0.2	0.3	-0.3
7	-0.2	0.0	0.0	-0.1	-0.2	-0.1	-0.2	-0.4	-0.5	-0.4	-0.2	-0.1	-0.5	-1.1	-1.6	-2.0	-2.4	-2.9	-3.4	-3.4	-3.6	-3.5	-3.9	-4.4
8	-4.7	-4.9	-5.1	-5.4	-5.4	-5.3	-5.3	-5.5	-5.8	-6.0	-5.2	-4.9	-5.9	-4.1	-4.0	-4.1	-4.5	-5.5	-7.1	-6.9	-7.3	-8.9	-9.6	-11.0
9	-12.0	-11.0	-12.0	-12.1	-12.7	-13.4	-13.4	-13.6	-14.8	-15.2	-13.8	-12.5	-11.1	-9.5	-8.2	-7.1	-7.0	-8.4	-9.6	-10.2	-12.0	-12.7	-12.0	-14.4
10	-14.0	-14.4	-14.7	-15.7	-14.8	-14.9	-14.9	-15.4	-15.8	-16.0	-14.6	-12.4	-10.6	-9.1	-8.6	-7.4	-7.3	-8.7	-10.8	-12.8	-15.2	-13.7	-14.7	-16.3
11	-16.2	-16.9	-17.1	-17.3	-18.4	-18.1	-17.7	-17.1	-16.3	-15.3	-14.2	-12.9	-11.4	-10.0	-8.1	-7.1	-6.1	-5.8	-5.3	-5.3	-5.1	-4.9	-5.1	-5.5
12	-5.9	-6.1	-5.9	-6.5	-6.1	-5.7	-5.7	-5.5	-5.5	-4.9	-4.1	-2.0	-0.8	0.7	1.0	1.4	1.5	1.1	0.7	0.6	-0.6	-0.8	-0.9	-0.3
13	-0.6	-0.8	-1.0	-1.0	-1.4	-1.1	-1.3	-1.6	-1.8	-2.7	-3.1	-3.3	-3.5	-3.4	-3.1	-3.0	-2.7	-4.1	-4.3	-4.8	-5.0	-5.2	-5.5	-5.7
14	-5.9	-6.1	-6.1	-6.7	-6.7	-7.0	-7.2	-7.3	-8.2	-8.5	-8.6	-8.0	-7.0	-6.7	-6.3	-6.4	-6.5	-7.1	-7.3	-7.4	-7.8	-8.0	-8.3	-8.8
15	-9.4	-10.1	-9.6	-9.4	-9.7	-10.0	-10.3	-10.6	-10.9	-11.5	-11.3	-10.8	-9.7	-9.1	-8.9	-8.8	-9.0	-9.3	-9.6	-9.9	-10.1	-10.4	-10.4	-10.5
16	-10.7	-11.1	-12.0	-12.7	-12.8	-14.9	-14.8	-15.3	-15.6	-16.5	-15.7	-14.3	-13.1	-11.0	-9.6	-9.0	-9.4	-11.1	-12.2	-13.8	-13.7	-13.7	-13.8	-16.1
17	-16.1	-16.0	-16.2	-16.8	-16.9	-17.2	-16.2	-15.4	-14.8	-14.4	-14.0	-12.6	-10.7	-9.8	-9.7	-9.5	-10.8	-11.2	-12.4	-11.9	-11.6	-12.0	-11.2	-11.6
18	-11.5	-11.7	-11.8	-12.8	-13.1	-13.2	-13.1	-14.0	-13.8	-13.2	-13.3	-12.2	-11.6	-11.0	-10.4	-10.0	-10.1	-11.3	-13.4	-14.5	-14.4	-14.1	-14.6	-15.2
19	-15.9	-17.1	-18.3	-19.1	-19.6	-20.3	-21.4	-21.9	-21.2	-21.1	-20.5	-18.8	-17.5	-15.9	-13.8	-12.1	-11.5	-11.5	-14.7	-16.8	-16.5	-18.1	-18.3	-19.5
20	-20.9	-19.7	-20.0	-20.3	-21.1	-21.3	-20.5	-21.1	-20.9	-19.1	-16.3	-12.7	-5.1	-4.0	-3.5	-3.0	-2.7	-2.7	-1.7	-1.3	-1.6	-1.9	-2.9	-2.6
21	-2.5	-2.2	-2.0	-2.6	-2.7	-2.5	-2.5	-2.1	-2.1	-2.3	-2.3	-1.9	-1.6	-1.0	0.1	0.7	0.9	0.9	0.5	-1.1	-1.8	-1.8	-2.2	-2.5
22	-1.8	-1.1	-1.1	0.3	0.3	-1.0	-1.6	-0.9	-1.2	-1.4	-0.7	-0.9	-1.5	-1.9	-2.5	-2.9	-3.5	-4.3	-4.9	-5.6	-6.1	-6.4	-6.7	-6.9
23	-7.0	-7.5	-7.8	-8.2	-8.6	-8.6	-8.6	-8.8	-8.8	-8.8	-8.6	-7.8	-7.8	-7.3	-6.8	-6.5	-7.1	-8.0	-9.5	-9.6	-9.4	-9.7	-10.8	-12.0
24	-12.1	-12.7	-13.1	-14.6	-14.9	-15.9	-16.7	-15.6	-15.6	-17.6	-16.2	-15.6	-15.2	-14.5	-13.4	-12.9	-13.0	-13.7	-15.1	-17.6	-18.3	-19.7	-20.3	-22.6
25	-21.0	-19.4	-18.3	-17.6	-16.5	-15.0	-14.5	-13.8	-12.7	-13.9	-12.1	-12.8	-11.3	-10.7	-10.5	-10.4	-11.0	-12.7	-15.5	-18.1	-19.6	-22.9	-23.4	-20.1
26	-22.4	-24.9	-25.2	-25.4	-25.0	-25.7	-23.5	-21.5	-22.2	-21.5	-19.8	-17.5	-15.7	-13.7	-12.0	-10.5	-10.1	-9.5	-9.2	-8.8	-8.1	-7.5	-3.4	-3.3
27	-3.1	-2.8	-2.9	-2.4	-2.3	-2.4	-2.4	-2.1	-2.2	-1.8	-2.3	-2.4	-1.9	-1.3	-0.9	-1.1	-1.4	-1.8	-2.7	-2.9	-3.2	-3.9	-4.0	-6.1
28	-5.7	-5.9	-7.1	-8.6	-9.1	-10.0	-10.9	-11.0	-12.4	-12.6	-12.6	-12.6	-11.3	-11.4	-11.7	-11.8	-12.1	-13.1	-15.0	-16.5	-16.8	-16.8	-17.0	-17.6
29	-18.4	-19.8	-20.9	-19.4	-19.1	-18.9	-18.9	-18.8	-18.7	-18.6	-18.4	-17.6	-16.8	-15.6	-14.3	-14.0	-13.7	-15.3	-17.8	-18.1	-17.8	-20.9	-24.3	-25.2
30	-25.9	-27.0	-26.5	-26.7	-26.0	-28.7	-28.6	-30.8	-30.7	-28.0	-28.3	-25.2	-21.6	-20.0	-18.8	-18.1	-17.8	-17.3	-16.9	-17.1	-17.1	-16.9	-15.4	-12.3
31	-10.8	-9.8	-9.0	-11.4	-11.2	-12.3	-13.2	-13.4	-14.3	-14.6	-15.3	-15.1	-15.0	-14.5	-14.4	-14.1	-14.6	-15.8	-16.3	-17.0	-18.1	-19.2	-19.8	-21.0

*Temperatures in tenths of degrees Celsius — Températures en dixième de degrés Celsius

DEWPOINT TEMPERATURE SUMMARY - SOMMAIRE DES TEMPÉRATURES DU POINT DE ROSÉE

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-6.6	-6.2	-6.4	-5.8	-4.3	-4.3	-1.9	-2.0	0.4	-0.2	-2.1	-1.2	0.2	0.1	-0.2	-0.3	0.0	-1.2	-0.9	-1.3	-1.2	-1.0	-1.7	-1.7
2	-1.1	-2.2	-2.7	-2.4	-2.8	-3.0	-3.1	-2.8	-3.1	-3.8	-3.8	-3.9	-3.9	-4.3	-4.2	-4.5	-4.4	-4.3	-3.9	-4.3	-4.9	-4.7	-4.1	-3.7
3	-3.5	-3.5	-3.6	-3.5	-3.7	-3.9	-4.3	-3.9	-3.5	-3.3	-3.4	-3.3	-3.0	-3.0	-3.2	-3.5	-3.9	-4.0	-4.4	-6.6	-6.5	-6.6	-6.8	-6.8
4	-7.0	-7.1	-6.4	-6.5	-6.2	-6.2	-6.5	-6.6	-6.4	-6.4	-6.7	-5.4	-5.8	-6.1	-5.8	-5.1	-5.0	-4.4	-4.7	-4.0	-4.2	-4.3	-4.8	-5.4
5	-6.5	-6.4	-6.8	-9.5	-11.1	-12.0	-10.5	-9.7	-9.2	-8.7	-8.7	-8.4	-7.9	-7.5	-6.8	-6.6	-6.1	-6.2	-6.5	-8.3	-11.1	-11.6	-11.9	-12.4
6	-13.0	-11.4	-10.5	-10.2	-9.5	-8.6	-7.9	-6.6	-4.6	-2.7	-2.4	-2.2	-2.0	-1.9	-2.0	-1.9	-1.7	-1.1	-1.3	-1.0	-1.0	-1.0	-1.0	-1.1
7	-1.1	-1.6	-1.9	-1.6	-1.6	-1.9	-2.4	-2.8	-2.7	-2.3	-2.7	-3.7	-4.6	-6.6	-7.0	-7.3	-7.9	-7.8	-8.2	-7.8	-7.6	-7.6	-7.6	-8.8
8	-9.0	-9.1	-9.3	-9.1	-9.0	-8.3	-8.1	-8.3	-8.8	-8.8	-8.9	-9.2	-9.6	-9.1	-9.8	-9.8	-10.5	-11.1	-11.0	-11.0	-12.4	-13.2	-13.5	-14.1
9	-14.3	-13.8	-13.5	-14.7	-15.4	-16.1	-16.2	-16.3	-17.2	-17.6	-16.9	-16.6	-16.4	-16.0	-15.6	-14.9	-13.6	-13.8	-13.8	-14.1	-15.7	-16.3	-16.2	-17.0
10	-16.3	-16.9	-16.8	-17.5	-16.8	-16.8	-17.0	-17.9	-16.9	-17.8	-16.7	-15.7	-15.0	-14.6	-13.7	-14.1	-13.3	-14.3	-14.4	-15.2	-16.7	-15.7	-16.3	-17.6
11	-19.6	-20.7	-20.2	-20.5	-21.9	-21.5	-21.1	-20.3	-19.5	-18.4	-16.9	-15.4	-13.6	-12.8	-11.8	-11.5	-11.0	-10.5	-9.9	-9.1	-8.6	-8.3	-7.8	-7.7
12	-8.3	-7.8	-8.1	-8.2	-8.0	-7.9	-7.7	-7.4	-6.8	-6.6	-5.3	-5.5	-1.6	-1.1	-1.0	-2.3	-2.7	-2.7	-3.1	-2.7	-2.4	-2.5	-2.6	-2.7
13	-3.2	-3.2	-3.8	-4.1	-3.6	-3.5	-3.1	-3.5	-5.3	-7.2	-8.0	-7.9	-8.1	-8.0	-8.2	-8.2	-9.4	-9.4	-9.2	-9.4	-9.1	-9.2	-9.5	-9.6
14	-10.0	-9.5	-9.8	-10.5	-10.3	-10.3	-10.3	-10.3	-10.2	-10.7	-11.1	-10.9	-11.5	-11.7	-11.5	-11.7	-11.6	-11.6	-12.0	-12.0	-11.6	-11.2	-12.2	-12.8
15	-12.8	-13.1	-13.2	-13.5	-13.9	-14.4	-14.3	-14.3	-14.6	-14.0	-14.2	-14.2	-13.9	-13.8	-14.2	-13.7	-13.8	-13.9	-13.3	-13.8	-14.3	-14.2	-14.3	-14.8
16	-14.7	-15.0	-15.3	-16.1	-15.8	-16.9	-16.7	-17.2	-20.5	-20.8	-19.6	-19.2	-18.5	-17.4	-15.7	-15.6	-17.2	-17.8	-17.9	-18.7	-18.4	-18.8	-19.0	-20.7
17	-20.3	-20.3	-20.4	-20.7	-21.0	-20.9	-19.9	-19.1	-18.3	-18.1	-17.8	-17.0	-15.9	-15.9	-15.8	-15.9	-16.1	-16.6	-17.6	-16.6	-16.1	-16.1	-15.7	-15.9
18	-15.4	-16.4	-15.7	-17.3	-17.5	-17.4	-18.1	-17.9	-18.0	-17.7	-17.2	-16.9	-16.7	-16.8	-17.1	-17.1	-17.7	-18.9	-19.6	-19.1	-19.1	-18.8	-19.7	
19	-20.5	-21.2	-22.7	-23.5	-24.5	-25.2	-25.8	-26.6	-26.2	-26.2	-25.1	-25.0	-23.0	-22.5	-21.2	-20.0	-19.4	-19.3	-20.9	-20.9	-20.4	-21.6	-21.7	-24.3
20	-25.0	-22.9	-23.5	-23.8	-25.1	-24.0	-24.5	-25.3	-25.1	-22.7	-19.8	-19.3	-9.3	-8.1	-8.1	-7.5	-7.5	-7.3	-7.1	-7.5	-8.8	-5.1	-3.5	-3.4
21	-3.2	-3.4	-3.9	-3.3	-3.3	-4.1	-4.8	-4.8	-4.6	-4.5	-4.6	-4.4	-4.3	-3.8	-3.5	-3.2	-3.2	-3.1	-2.8	-2.4	-3.1	-2.7	-3.3	-3.3
22	-2.7	-2.1	-1.9	-1.8	-2.0	-2.4	-2.3	-1.5	-2.2	-2.2	-2.1	-2.7	-3.2	-3.0	-4.6	-5.5	-6.3	-7.0	-7.8	-8.1	-8.4	-8.6	-8.5	-9.2
23	-8.5	-9.5	-9.8	-9.4	-10.1	-10.3	-10.0	-10.1	-10.4	-10.4	-10.9	-10.3	-9.8	-9.7	-9.7	-9.7	-11.0	-11.7	-12.6	-12.3	-12.7	-13.4	-15.2	-16.0
24	-15.8	-16.7	-17.2	-18.2	-17.6	-18.9	-19.7	-21.2	-22.0	-22.6	-22.0	-21.8	-21.3	-21.3	-20.0	-19.9	-20.0	-20.4	-21.1	-24.3	-23.7	-23.0	-23.5	-26.4
25	-25.2	-23.1	-22.0	-21.5	-19.8	-17.9	-17.1	-16.2	-15.8	-16.7	-15.4	-16.2	-17.1	-17.3	-19.0	-19.8	-19.8	-21.2	-21.8	-22.8	-24.3	-25.9	-27.4	-23.3
26	-25.8	-29.3	-29.6	-29.5	-29.0	-30.1	-29.6	-29.7	-26.5	-25.3	-23.7	-20.9	-18.7	-15.7	-14.1	-12.1	-11.4	-10.3	-10.4	-9.8	-9.2	-8.6	-3.6	-4.1
27	-3.7	-3.5	-3.5	-2.7	-2.7	-2.8	-3.0	-2.7	-3.0	-2.9	-3.1	-3.1	-3.5	-3.2	-2.4	-2.1	-1.9	-2.3	-4.0	-4.3	-5.1	-5.6	-6.7	-8.0
28	-7.9	-9.1	-9.9	-11.1	-12.4	-11.3	-14.1	-15.2	-15.7	-15.7	-16.1	-15.7	-15.6	-15.9	-16.5	-16.8	-17.2	-18.0	-23.4	-22.9	-22.6	-22.1	-22.5	-23.4
29	-24.3	-25.3	-23.6	-24.9	-21.2	-21.4	-23.7	-23.8	-23.1	-23.0	-22.5	-23.0	-23.0	-26.9	-23.4	-22.5	-22.7	-23.4	-23.7	-23.3	-24.9	-27.5	-29.4	
30	-29.9	-32.1	-30.8	-30.6	-30.4	-33.3	-33.0	-36.0	-34.8	-34.3	-32.7	-29.4	-27.0	-26.6	-25.6	-25.5	-25.4	-26.2	-21.2	-20.3	-19.9	-21.0	-24.4	
31	-12.7	-11.2	-10.5	-13.2	-12.8	-14.9	-15.1	-15.2	-16.7	-17.4	-17.4	-18.1	-14.9	-13.4	-14.7	-14.1	-14.6	-15.7	-16.4	-17.0	-17.4	-22.7	-23.7	-25.3

DRY-BULB TEMPERATURE SUMMARY*
SOMMAIRE DES TEMPÉRATURES DU THERMOMÈTRE SEC*

MONTH JANUARY
MOIS JANVIER

1982

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-21.7	-22.6	-23.4	-24.2	-25.1	-26.5	-26.9	-26.8	-27.2	-27.7	-26.8	-25.3	-23.8	-22.1	-20.6	-19.3	-19.3	-20.6	-22.4	-25.3	-27.1	-28.2	-27.7	-29.4
2	-29.3	-27.1	-26.1	-24.7	-24.4	-24.0	-22.5	-21.8	-20.9	-18.9	-16.7	-5.6	-4.8	-4.0	-3.7	-3.9	-4.1	-4.0	-3.1	-2.4	-2.1	-2.0	-1.9	-2.0
3	-2.0	-2.6	-3.6	-4.1	-5.7	-7.1	-7.7	-8.5	-10.0	-11.4	-12.9	-13.7	-13.6	-14.1	-14.0	-13.5	-13.7	-15.1	-18.2	-16.6	-18.9	-18.9	-16.9	-18.1
4	-18.4	-18.1	-17.7	-17.9	-17.9	-17.4	-17.8	-17.6	-16.9	-17.3	-17.1	-16.9	-16.2	-15.1	-14.4	-14.1	-14.3	-14.3	-16.2	-16.3	-18.2	-19.3	-20.4	-21.7
5	-22.1	-21.9	-24.1	-22.9	-27.2	-28.1	-24.3	-23.7	-23.8	-24.2	-22.5	-20.1	-17.2	-10.8	-9.3	-8.4	-5.2	-4.3	-4.1	-4.2	-4.2	-5.9	-8.2	-14.1
6	-16.4	-17.6	-19.0	-20.0	-21.2	-22.3	-22.9	-23.4	-24.3	-24.5	-24.4	-23.4	-23.2	-22.1	-21.1	-20.7	-20.7	-21.6	-22.7	-23.2	-23.4	-23.7	-24.0	-24.1
7	-25.0	-25.2	-25.7	-26.2	-26.8	-27.9	-27.4	-28.0	-28.7	-29.2	-28.7	-27.4	-25.6	-23.9	-22.0	-21.4	-20.9	-21.2	-24.9	-25.9	-27.4	-31.0	-31.2	-32.1
8	-33.2	-32.5	-33.2	-33.4	-31.6	-30.3	-28.2	-27.9	-25.4	-23.3	-23.5	-22.9	-22.9	-22.6	-22.4	-22.5	-23.0	-23.9	-26.0	-26.8	-27.5	-28.5	-29.4	-30.0
9	-30.5	-31.1	-32.0	-32.5	-32.7	-32.3	-33.2	-33.7	-33.8	-33.1	-32.9	-32.3	-31.5	-30.3	-29.8	-29.5	-29.8	-30.3	-30.7	-31.5	-31.8	-31.8	-32.0	-31.8
10	-31.9	-32.2	-32.5	-32.5	-32.8	-32.3	-31.3	-30.2	-30.5	-36.3	-35.5	-34.8	-34.3	-26.3	-24.9	-23.3	-21.4	-19.6	-19.2	-18.2	-17.2	-20.1	-23.2	-22.4
11	-22.1	-21.7	-21.7	-21.7	-21.3	-20.8	-20.2	-12.5	-11.4	-12.4	-12.5	-12.6	-12.8	-13.0	-12.9	-12.6	-11.5	-11.9	-13.0	-13.6	-15.1	-15.8	-17.3	-18.2
12	-18.8	-19.7	-24.1	-24.9	-22.3	-21.1	-22.5	-22.5	-23.4	-22.9	-23.0	-22.3	-21.6	-20.1	-19.0	-16.6	-15.6	-16.6	-17.7	-21.7	-22.7	-24.4	-25.7	-26.4
13	-27.9	-26.9	-28.1	-29.4	-28.2	-30.0	-31.8	-31.0	-31.6	-30.6	-29.6	-26.8	-24.6	-20.6	-18.9	-16.6	-16.0	-15.5	-15.2	-15.1	-17.2	-22.2	-25.4	-25.2
14	-22.4	-20.9	-14.2	-14.5	-20.4	-20.0	-18.8	-18.6	-17.7	-17.3	-17.4	-16.3	-14.6	-12.9	-10.5	-9.2	-9.2	-8.7	-9.1	-9.7	-11.0	-10.0	-9.8	-10.7
15	-10.4	-6.6	-6.7	-7.1	-7.6	-8.4	-9.3	-9.2	-10.7	-12.1	-12.6	-12.3	-12.9	-12.9	-13.5	-14.0	-14.9	-16.5	-18.5	-19.5	-21.3	-22.7	-24.1	-25.4
16	-26.7	-27.5	-28.6	-29.3	-30.1	-31.2	-31.2	-31.5	-32.2	-33.1	-33.1	-32.6	-32.0	-31.6	-31.0	-30.8	-30.7	-30.7	-30.7	-30.7	-31.0	-31.2	-31.4	-32.1
17	-33.8	-33.3	-33.6	-34.5	-34.8	-34.5	-35.5	-35.3	-36.6	-39.8	-36.7	-34.1	-31.4	-29.7	-27.4	-26.0	-26.2	-26.9	-28.4	-29.6	-31.7	-33.1	-31.7	-32.7
18	-33.4	-34.1	-34.2	-35.1	-36.2	-36.3	-35.1	-37.5	-35.0	-36.9	-33.9	-30.8	-27.8	-24.9	-22.6	-20.8	-19.8	-20.2	-21.3	-24.7	-25.1	-22.1	-21.7	-20.9
19	-20.4	-19.9	-19.0	-18.8	-17.0	-11.7	-11.9	-13.0	-12.5	-13.2	-12.1	-10.3	-9.1	-9.1	-9.2	-9.1	-11.0	-11.8	-14.2	-15.6	-16.9	-18.9	-19.3	-20.7
20	-21.2	-21.8	-22.7	-24.0	-27.2	-26.3	-29.0	-29.0	-30.3	-32.5	-30.1	-27.4	-25.4	-24.2	-22.9	-22.1	-21.3	-21.7	-22.1	-22.6	-24.4	-24.6	-25.0	-26.5
21	-28.1	-28.8	-30.5	-30.2	-30.2	-28.0	-26.7	-26.7	-25.3	-25.0	-24.0	-22.9	-21.1	-19.6	-18.3	-18.2	-18.1	-18.6	-19.6	-21.1	-25.7	-28.2	-28.9	-27.6
22	-29.7	-26.8	-26.4	-28.0	-28.1	-27.6	-27.6	-28.2	-28.5	-27.1	-22.4	-15.7	-14.3	-13.5	-12.8	-12.1	-11.7	-11.1	-10.9	-10.9	-11.3	-12.1	-12.4	-12.1
23	-11.9	-12.1	-11.5	-11.1	-11.9	-13.5	-13.6	-13.8	-15.3	-15.9	-16.6	-17.3	-17.4	-17.4	-18.1	-18.5	-18.7	-18.8	-18.8	-19.1	-19.1	-19.5	-20.0	-20.5
24	-21.4	-22.4	-23.7	-24.9	-25.8	-26.3	-27.1	-28.5	-29.5	-29.5	-28.7	-27.2	-25.3	-23.5	-21.0	-19.6	-18.5	-19.8	-21.9	-23.6	-22.3	-25.2	-25.9	-26.2
25	-25.0	-25.8	-26.1	-25.9	-26.2	-27.4	-27.1	-27.6	-27.6	-27.3	-26.0	-24.0	-21.6	-19.4	-17.0	-15.0	-14.1	-15.6	-17.7	-19.6	-20.8	-20.5	-20.4	-20.6
26	-20.4	-21.5	-22.2	-25.7	-26.0	-24.5	-27.6	-28.3	-30.2	-28.8	-27.4	-23.1	-20.2	-18.4	-17.6	-18.2	-16.8	-17.0	-16.6	-16.3	-15.8	-15.4	-13.9	-13.1
27	-10.1	-8.5	-7.0	-6.4	-5.9	-5.2	-3.9	-3.8	-3.0	-3.3	-3.7	-3.4	-3.2	-3.0	-3.0	-3.2	-2.4	-2.3	-3.1	-2.5	-3.3	-1.8	-1.8	-1.9
28	-2.9	-3.5	-5.9	-7.1	-9.3	-10.1	-11.1	-12.6	-14.9	-16.2	-17.9	-18.1	-18.2	-17.2	-16.2	-15.3	-14.0	-14.1	-14.3	-14.7	-15.1	-15.3	-15.8	-15.9
29	-16.7	-17.3	-18.1	-18.7	-18.7	-18.5	-18.7	-19.0	-18.8	-18.3	-17.1	-16.8	-17.0	-16.6	-15.7	-14.3	-13.2	-13.8	-13.9	-15.9	-18.5	-17.4	-19.7	-15.6
30	-18.8	-18.4	-16.9	-14.8	-12.0	-11.3	-11.9	-13.2	-15.4	-17.2	-19.6	-19.5	-18.9	-18.3	-17.6	-17.1	-16.7	-17.5	-18.7	-20.1	-21.1	-21.9	-21.7	-23.0
31	-23.1	-24.9	-23.8	-26.8	-28.0	-30.3	-31.5	-30.0	-30.0	-31.9	-29.7	-26.7	-24.1	-21.7	-19.4	-18.9	-18.3	-19.5	-20.3	-21.8	-24.4	-25.4	-23.3	-26.6

*Temperatures in tenths of degrees Celsius – Températures en dixième de degrés Celsiu.

DEWPOINT TEMPERATURE SUMMARY – SOMMAIRE DES TEMPERATURES DU POINT DE ROSEE

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-28.7	-29.8	-31.1	-31.6	-31.7	-32.4	-32.3	-32.7	-33.1	-33.9	-33.0	-32.2	-31.2	-30.2	-29.5	-30.4	-29.7	-30.0	-30.0	-30.2	-32.0	-33.0	-32.2	-33.6
2	-33.6	-30.9	-31.1	-29.5	-29.0	-28.9	-26.5	-25.7	-24.2	-22.1	-19.5	-8.4	-7.4	-6.5	-5.5	-5.2	-5.1	-4.7	-3.6	-3.7	-3.2	-2.9	-2.7	-2.7
3	-2.6	-3.0	-4.1	-6.0	-8.8	-10.3	-11.3	-12.2	-14.3	-15.7	-16.7	-17.6	-18.3	-18.5	-19.1	-19.1	-22.1	-22.1	-23.0	-22.0	-23.4	-23.2	-22.7	-23.0
4	-23.2	-22.7	-22.9	-23.1	-23.2	-22.5	-22.7	-22.0	-22.6	-23.2	-23.1	-22.9	-22.7	-22.2	-21.5	-21.6	-21.2	-21.0	-22.2	-22.8	-23.2	-23.8	-24.7	-25.8
5	-25.8	-25.9	-28.7	-27.1	-31.5	-33.0	-28.5	-27.5	-27.8	-28.3	-26.6	-23.7	-20.3	-16.9	-10.7	-9.8	-6.4	-7.0	-6.8	-7.0	-6.5	-9.0	-12.2	-17.1
6	-19.8	-20.6	-29.2	-27.0	-27.1	-27.8	-28.7	-29.5	-30.6	-30.9	-30.6	-30.2	-30.1	-29.3	-28.0	-27.6	-27.1	-28.1	-29.3	-29.7	-29.5	-29.7	-30.0	-30.6
7	-31.1	-31.4	-31.9	-32.2	-32.7	-33.8	-33.3	-33.9	-34.4	-34.9	-34.3	-33.8	-32.2	-30.9	-28.9	-28.9	-28.5	-29.0	-30.8	-31.1	-31.2	-36.1	-34.9	-36.5
8	-37.5	-37.6	-37.6	-38.2	-36.0	-34.8	-32.1	-31.8	-29.8	-28.0	-29.7	-29.5	-30.3	-29.8	-30.0	-30.1	-31.1	-31.8	-33.5	-33.9	-35.3	-35.9	-36.5	-36.9
9	-37.3	-38.0	-38.7	-38.8	-38.9	-38.3	-38.7	-39.4	-38.9	-39.4	-38.7	-39.0	-37.6	-36.3	-37.2	-36.7	-37.1	-38.5	-38.5	-39.1	-39.3	-39.4	-39.0	-39.1
10	-39.2	-39.3	-38.8	-38.7	-39.0	-38.7	-36.5	-35.7	M	M	M	M	M	-30.9	-29.5	-27.8	-26.6	-25.2	-25.7	-23.7	-23.4	-28.1	-28.0	-27.6
11	-26.7	-26.4	-27.8	-26.7	-25.0	-25.3	-23.9	-16.9	-16.2	-18.0	-18.6	-19.5	-20.5	-20.3	-20.5	-20.2	-20.5	-20.7	-21.0	-21.7	-21.9	-22.4	-23.1	-24.0
12	-24.3	-25.0	-28.2	-30.1	-27.2	-26.3	-26.8	-27.6	-28.5	-28.0	-28.6	-27.7	-28.0	-27.2	-25.8	-25.0	-24.5	-26.0	-26.2	-28.1	-28.9	-29.0	-30.0	-30.6
13	-32.5	-31.3	-32.3	-34.2	-33.0	-34.4	-36.7	-35.2	-35.6	-34.9	-34.5	-31.8	-30.0	-27.1	-26.3	-25.2	-23.4	-21.9	-19.5	-20.3	-22.4	-26.1	-30.6	-29.5
14	-26.7	-24.9	-17.6	-17.6	-23.9	-23.4	-22.2	-22.4	-21.5	-20.5	-20.7	-19.6	-18.1	-16.3	-14.5	-11.8	-11.1	-9.9	-10.5	-11.0	-12.5	-11.0	-11.2	-12.0
15	-11.8	-10.5	-11.1	-10.9	-10.9	-12.1	-12.6	-13.6	-15.1	-16.4	-16.8	-16.8	-16.7	-17.3	-19.5	-19.0	-23.1	-25.2	-26.0	-27.3	-28.5	-31.1	-30.9	-32.7
16	-33.0	-33.1	-34.9	-37.5	-39.3	-39.8	-39.2	-38.5	-39.7	-41.0	-41.5	-40.4	-40.5	-39.9	-39.4	-38.9	-38.9	-39.3	-39.8	-38.5	-38.6	-39.2	-39.0	-40.1
17	-40.2	-39.5	-39.1	M	-40.7	-39.4	-40.3	-40.1	M	M	M	-40.1	-39.8	-38.9	-37.4	-37.1	-36.4	-35.1	-34.9	-35.4	-37.1	-38.5	-39.1	-39.1
18	-38.0	-39.2	-39.7	M	M	M	-39.8	M	-39.7	M	-37.8	-37.0	-35.5	-33.8	-33.2	-33.3	-31.8	-31.2	-29.1	-32.2	-31.2	-30.0	-29.7	-26.0
19	-24.8	-24.6	-22.8	-22.4	-21.6	-18.4	-13.7	-14.1	-13.8	-14.7	-13.6	-12.4	-12.9	-13.8	-14.3	-14.1	-16.2	-17.4	-19.7	-20.8	-25.6	-26.5	-26.3	-27.0
20	-28.1	-27.8	-28.8	-29.8	-32.4	-41.7	-35.0	-33.8	-33.8	-35.1	-34.1	-32.4	-31.3	-31.2	-30.6	-30.9	-30.9	-30.0	-30.1	-29.9	-30.3	-30.1	-31.1	-31.5
21	-32.3	-33.0	-35.4	-34.9	-35.5	-32.4	-32.2	-32.4	-31.3	-32.4	-28.9	-27.7	-26.2	-24.8	-25.2	-24.4	-24.3	-25.1	-25.1	-27.6	-29.9	-31.8	-34.1	-31.4
22	-34.4	-31.1	-30.4	-32.6	-33.1	-31.4	-31.7	-32.6	-33.1	-31.4	-27.1	-22.4	-20.7	-20.0	-19.0	-16.2	-19.0	-12.8	-12.3	-12.3	-12.0	-13.9	-13.7	-13.6
23	-13.5	-13.5	-12.4	-12.6	-13.3	-15.4	-16.5	-17.1	-18.4	-19.4	-23.0	-23.4	-24.2	-24.5	-24.3	-24.3	-25.1	-25.6	-24.9	-25.0	-25.5	-26.1	-27.1	-27.5
24	-28.2	-29.5	-30.6	-31.8	-33.0	-33.4	-34.4	-35.3	-35.7	-36.0	-35.5	-34.6	-32.1	-31.1	-30.4	-29.5	-28.8	-29.5	-28.7	-30.2	-29.0	-31.4	-31.2	-31.7
25	-30.6	-31.6	-32.2	-31.9	-32.2	-33.4	-33.2	-33.8	-33.1	-33.4	-32.7	-31.4	-30.8	-28.7	-27.2	-25.1	-24.6	-24.5	-25.8	-27.2	-26.9	-26.9	-25.9	-27.3
26	-25.9	-27.0	-27.4	-28.7	-31.3	-29.0	-32.2	-32.4	-34.4	-32.2	-32.2	-28.9	-28.5	-27.7	-25.5	-25.1	-25.3	-24.7	-22.8	-21.4	-21.2	-19.4	-17.2	-15.7
27	-13.4	-11.6	-10.2	-9.7	-9.1	-8.7	-9.2	-8.8	-9.6	-9.3	-8.5	-8.8	-8.6	-8.5	-8.0	-7.9	-7.3	-6.6	-6.5	-6.3	-6.1	-5.6	-5.3	-5.8
28	-7.5	-8.0	-11.1	-12.0	-14.3	-15.6	-17.0	-17.4	-28.0	-24.4	-23.9	-25.7	-25.8	-25.2	-24.4	-22.9	-22.9	-22.7	-23.4	-23.5	-23.8	-24.2	-24.8	-25.2
29	-26.1	-26.3	-26.6	-27.0	-26.5	-26.9	-26.3	-26.3	-26.0	-25.4	-24.6	-24.4	-21.3	-20.6	-19.3	-17.7	-16.4	-16.7	-18.4	-19.5	-21.1	-20.5	-23.4	-18.7
30	-22.0	-22.0	-20.1	-17.5	-16.1	-14.6	-16.2	-16.8	-19.1	-21.7	-27.6	-27.3	-27.5	-26.8	-26.5	-26.6	-26.6	-26.4	-27.1	-27.6	-28.1	-28.4	-28.0	-29.0
31	-29.2	-31.0	-29.9	-31.7	-33.2	-35.4	-36.5	-34.8	-35.0	-37.0	-34.7	-32.5	-31.3	-30.1	-29.0	-26.7	-25.2	-26.0	-26.5	-26.5	-28.7	-30.6	-28.0	-31.2

"M" denotes missing data.

DRY-BULB TEMPERATURE SUMMARY*
SOMMAIRE DES TEMPÉRATURES DU THERMOMÈTRE SEC*

MONTH / MOIS: FEBRUARY / FEVRIER — 1982

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-26.9	-27.9	-26.3	-23.6	-22.1	-20.2	-19.7	-18.6	-17.0	-16.9	-15.3	-14.0	-12.6	-11.8	-11.1	-10.1	-9.8	-9.7	-10.1	-10.0	-9.8	-10.5	-10.3	-10.
2	-10.4	-10.2	-11.8	-13.8	-13.5	-12.7	-12.1	-12.4	-13.4	-12.1	-12.0	-11.1	-10.8	-10.4	-10.4	-9.9	-10.6	-11.3	-13.8	-16.2	-17.7	-18.6	-18.8	-20.
3	-21.2	-23.1	-24.7	-25.9	-26.1	-26.3	-29.9	-28.3	-29.8	-28.5	-27.5	-25.9	-23.4	-22.0	-20.8	-19.7	-19.6	-19.6	-21.1	-22.9	-24.2	-23.6	-24.0	-28.
4	-29.1	-31.5	-29.8	-32.8	-34.1	-33.5	-34.1	-35.7	-33.0	-33.7	-30.0	-25.6	-22.6	-20.6	-17.9	-16.0	-15.3	-16.3	-17.5	-20.1	-18.6	-19.9	-22.7	-22.
5	-23.6	-26.2	-28.6	-31.2	-31.5	-30.8	-33.0	-33.2	-34.7	-34.6	-28.6	-26.1	-23.6	-21.2	-20.0	-18.8	-17.7	-18.0	-18.8	-22.3	-24.1	-24.9	-25.7	-28.
6	-29.7	-29.8	-30.5	-31.1	-32.4	-30.9	-31.9	-32.1	-34.3	-33.1	-29.1	-24.3	-21.5	-18.6	-17.0	-17.8	-17.2	-14.9	-13.9	-14.1	-12.8	-12.7	-12.9	-12.
7	-13.1	-13.9	-14.5	-14.8	-14.8	-15.1	-16.0	-16.7	-17.5	-17.7	-16.9	-16.1	-15.2	-14.9	-14.2	-13.7	-13.1	-13.3	-13.7	-14.3	-14.7	-16.8	-16.5	-17.
8	-16.7	-17.7	-18.5	-17.8	-23.6	-26.1	-27.8	-27.5	-25.7	-23.4	-20.6	-17.7	-16.2	-15.1	-14.3	-13.8	-13.8	-13.7	-15.1	-16.5	-17.3	-17.9	-20.0	-19.9
9	-21.7	-24.5	-24.5	-22.5	-24.1	-26.1	-27.4	-29.2	-24.9	-24.4	-23.9	-23.0	-21.6	-19.6	-17.4	-17.2	-17.2	-17.6	-19.2	-20.6	-21.9	-22.7	-22.9	-24.9
10	-25.6	-23.5	-22.9	-23.7	-24.9	-24.3	-23.9	-26.9	-28.8	-29.3	-24.1	-21.4	-19.6	-18.2	-16.4	-13.4	-11.8	-11.5	-12.5	-15.4	-14.1	-19.9	-18.1	-16.
11	-16.6	-17.4	-15.3	-13.9	-14.1	-12.9	-13.1	-13.3	-13.5	-13.0	-13.1	-12.4	-11.6	-11.2	-10.6	-10.2	-10.4	-10.9	-12.3	-13.6	-15.9	-18.3	-19.3	-22.
12	-22.9	-23.5	-25.3	-25.7	-27.2	-23.6	-24.4	-24.6	-26.8	-22.4	-20.8	-18.3	-16.4	-14.2	-12.4	-10.9	-10.0	-10.2	-12.2	-10.9	-11.1	-14.3	-15.7	-16.0
13	-16.7	-18.3	-20.6	-22.7	-24.2	-23.1	-24.3	-23.8	-23.6	-22.1	-19.4	-17.1	-15.7	-13.8	-12.1	-10.3	-9.1	-9.2	-11.5	-13.1	-16.2	-20.1	-22.4	-23.6
14	-20.9	-26.3	-25.8	-26.1	-26.6	-28.3	-27.7	-27.1	-25.7	-24.7	-22.6	-19.1	-13.2	-10.4	-7.9	-7.4	-7.1	-6.7	-5.9	-6.1	-5.9	-5.0	-4.0	-3.
15	-4.4	-5.0	-4.4	-4.4	-3.7	-2.2	-2.0	-2.3	-2.5	-3.2	-3.1	-3.3	-2.3	-1.5	-0.8	0.0	-0.1	-1.0	-2.1	-5.0	-6.5	-7.7	-8.5	-7.
16	-11.0	-12.7	-15.0	-15.0	-15.5	-12.4	-12.7	-12.7	-11.3	-10.0	-9.6	-9.1	-8.6	-7.4	-6.4	-6.1	-5.7	-6.0	-6.1	-6.2	-6.3	-6.2	-6.4	-6.5
17	-7.9	-7.4	-7.4	-9.2	-7.2	-6.2	-7.7	-7.3	-5.3	-4.9	-3.8	-3.1	-2.7	-2.7	-2.7	-2.3	-2.2	-2.6	-3.0	-3.3	-3.8	-3.7	-3.7	-4.2
18	-3.6	-3.2	-3.0	-2.6	-2.2	-2.2	-1.7	-2.3	-0.8	-0.4	0.3	0.9	1.7	1.7	2.0	2.0	2.0	1.8	1.6	1.6	2.0	1.6	2.0	1.9
19	1.4	1.8	1.6	1.9	1.6	1.5	1.4	1.1	0.4	0.4	0.1	0.2	0.7	1.1	1.5	1.5	1.9	1.4	0.4	0.1	-0.7	-0.4	-0.7	-0.6
20	-0.9	-0.9	-0.5	-0.7	-0.7	-0.9	-0.8	-0.9	-0.6	-0.7	1.9	2.6	3.1	3.9	3.5	3.4	3.1	2.2	2.2	0.6	-0.7	-1.4	-2.2	-3.1
21	-3.6	-4.1	-4.7	-5.3	-5.8	-6.0	-6.7	-5.9	-6.2	-6.9	-5.1	-3.5	-1.9	-1.0	-0.5	-0.4	-0.3	-1.6	-1.9	-3.3	-3.8	-3.3	-3.3	-3.2
22	-3.1	-3.3	-3.1	-3.3	-3.1	-2.8	-2.7	-3.0	-2.9	-2.7	-2.4	-1.9	-1.3	-0.5	-0.2	0.9	0.4	0.6	0.6	0.1	-0.5	-1.4	-3.2	-4.3
23	-7.5	-9.3	-11.1	-12.0	-13.1	-14.0	-15.5	-16.7	-16.9	-16.4	-14.6	-13.0	-11.2	-9.5	-7.8	-6.5	-6.1	-5.7	-9.7	-10.5	-10.4	-10.9	-10.4	-11.2
24	-10.4	-11.5	-10.5	-9.5	-9.8	-9.8	-10.0	-10.4	-11.1	-11.4	-11.5	-10.8	-10.4	-9.4	-9.7	-8.4	-7.9	-8.1	-9.0	-10.0	-14.6	-16.7	-18.6	-18.7
25	-22.4	-22.7	-22.0	-22.8	-24.4	-25.3	-23.0	-22.0	-25.0	-22.0	-19.4	-15.9	-12.4	-10.0	-7.4	-5.7	-4.6	-4.2	-5.2	-7.7	-9.7	-11.5	-13.6	-12.9
26	-12.6	-12.3	-12.1	-12.1	-9.8	-10.7	-10.8	-9.4	-9.9	-9.2	-8.1	-7.1	-6.7	-6.1	-5.8	-5.4	-4.9	-5.3	-5.2	-5.6	-6.4	-6.8	-7.0	-7.0
27	-8.1	-9.3	-11.2	-13.4	-14.7	-16.9	-18.4	-20.8	-22.9	-19.2	-16.4	-13.1	-12.5	-11.1	-9.4	-9.3	-9.1	-9.1	-10.0	-12.3	-14.5	-15.3	-16.9	-19.3
28	-20.7	-21.1	-21.2	-20.5	-19.5	-17.9	-16.7	-15.2	-14.4	-10.6	-9.6	-8.0	-6.3	-5.6	-5.2	-5.3	-5.3	-5.2	-5.0	-4.5	-3.1	-2.8	-3.8	-4.4

*Temperatures in tenths of degrees Celsius – Températures en dixième de degrés Celsius

DEWPOINT TEMPERATURE SUMMARY – SOMMAIRE DES TEMPERATURES DU POINT DE ROSEE

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-31.4	-33.0	-30.6	-27.8	-26.5	-24.7	-24.5	-23.4	-22.8	-22.4	-22.1	-22.7	-22.5	-20.0	-17.1	-17.3	-17.1	-17.5	-16.9	-15.4	-14.7	-13.4	-11.8	-11.7
2	-11.6	-11.5	-13.0	-14.3	-14.7	-14.2	-13.8	-14.4	-15.4	-14.7	-14.4	-14.0	-14.8	-14.9	-15.2	-15.7	-17.1	-18.9	-21.6	-22.7	-23.4	-24.6	-25.0	-26.5
3	-28.7	-28.8	-30.2	-31.1	-31.3	-31.2	-34.8	-33.7	-35.7	-33.4	-32.9	-32.5	-31.4	-30.4	-29.8	-29.7	-29.1	-29.4	-30.4	-31.1	-31.8	-31.1	-30.7	-35.1
4	-33.8	-37.3	-33.3	-37.7	-39.2	-39.0	-38.5	M	M	M	-34.8	-32.2	-29.8	-28.5	-27.7	-26.2	-25.6	-24.9	-26.3	-26.1	-26.3	-26.6	-28.2	-27.5
5	-29.1	-30.9	-33.3	-35.5	-37.1	-35.7	-39.4	-37.7	-39.2	-40.5	-33.3	-32.1	-30.6	-29.9	-29.3	-28.5	-28.0	-28.1	-28.9	-29.8	-30.8	-30.5	-32.3	-34.7
6	-34.7	-35.5	-35.5	-35.5	-37.4	-35.8	-36.7	-36.5	-39.6	-38.9	-34.3	-30.4	-28.9	-27.5	-25.2	-25.4	-23.0	-22.5	-20.9	-19.6	-19.1	-17.3	-17.6	-19.6
7	-20.0	-18.9	-21.8	-21.4	-21.2	-20.3	-23.1	-23.8	-24.2	-24.5	-24.0	-23.5	-23.4	-23.5	-22.7	-22.6	-22.1	-22.0	-21.6	-22.4	-22.4	-23.4	-23.1	-23.7
8	-23.1	-23.6	-23.6	-23.1	-27.6	-30.3	-33.1	-31.4	-30.6	-27.1	-25.1	-23.9	-23.4	-23.3	-22.7	-22.3	-24.9	-22.7	-22.4	-23.1	-23.8	-24.7	-25.6	-25.3
9	-26.3	-28.7	-28.2	-26.6	-28.1	-31.3	-31.9	-34.5	-29.3	-28.6	-29.1	-28.9	-28.0	-26.7	-27.5	-28.0	-28.3	-28.7	-29.7	-30.1	-30.9	-31.0	-30.6	-31.8
10	-32.5	-31.2	-30.5	-30.7	-31.1	-30.0	-29.8	-32.1	-33.8	-33.9	-30.6	-28.5	-27.2	-27.3	-25.6	-25.1	-24.3	-24.7	-24.4	-24.9	-25.2	-26.6	-25.0	-24.6
11	-24.0	-24.2	-23.0	-21.7	-21.7	-18.3	-18.1	-17.8	-18.9	-19.0	-19.7	-19.8	-20.3	-19.4	-19.7	-20.2	-20.6	-20.4	-21.4	-22.7	-23.5	-24.3	-24.1	-27.2
12	-27.3	-28.0	-30.3	-30.8	-31.6	-28.0	-29.0	-28.2	-30.9	-27.5	-26.1	-26.1	-25.2	-24.3	-22.5	-21.2	-21.0	-20.7	-21.2	-20.5	-20.3	-21.6	-21.9	-21.8
13	-22.7	-23.3	-25.6	-27.8	-29.0	-26.3	-29.2	-28.3	-28.4	-26.8	-24.3	-21.3	-19.6	-19.1	-18.4	-17.6	-17.6	-18.7	-20.4	-21.1	-21.9	-23.0	-26.8	-27.2
14	-24.2	-31.1	-30.1	-30.6	-31.4	-33.8	-32.7	-31.6	-31.4	-29.3	-27.5	-23.2	-16.9	-12.7	-10.5	-9.3	-9.4	-9.1	-8.8	-8.0	-7.9	-7.3	-6.0	-5.4
15	-5.8	-6.4	-6.0	-6.2	-5.6	-4.9	-5.5	-6.2	-6.5	-7.6	-8.2	-9.2	-9.8	-10.2	-10.9	-11.4	-12.8	-12.3	-13.3	-14.1	-15.2	-15.8	-16.1	-15.4
16	-16.6	-17.6	-21.6	-20.2	-19.8	-16.6	-16.9	-16.2	-15.6	-15.7	-15.4	-14.0	-12.7	-11.6	-11.6	-11.1	-10.6	-10.6	-9.8	-9.1	-9.6	-9.7	-10.0	-10.1
17	-10.7	-10.9	-10.9	-12.0	-9.8	-8.6	-9.4	-9.4	-10.1	-10.2	-9.4	-8.7	-9.0	-8.8	-8.7	-7.9	-8.4	-7.3	-7.7	-7.1	-6.9	-6.1	-6.3	-6.6
18	-6.6	-6.5	-6.3	-6.3	-6.3	-5.7	-5.3	-5.3	-5.0	-4.6	-4.9	-5.0	-4.8	-4.3	-3.5	-2.8	-2.3	-2.0	-1.5	-1.7	-1.6	-1.4	-1.3	-0.8
19	-0.5	-0.1	-0.9	-1.1	-1.1	-1.1	-2.6	-4.0	-4.7	-5.5	-6.0	-6.9	-6.9	-8.3	-6.5	-6.4	-4.8	-5.1	-4.1	-3.7	-3.5	-3.7	-2.9	-2.9
20	-2.7	-2.9	-3.2	-3.3	-2.3	-2.0	-3.0	-2.7	-2.8	-2.7	-1.6	-1.7	-2.1	-2.2	-2.9	-2.3	-2.0	-0.7	-2.9	-4.2	-5.2	-6.3	-6.6	-7.2
21	-8.1	-8.4	-8.6	-9.3	-9.9	-9.9	-9.9	-9.8	-9.7	-9.8	-9.7	-8.7	-7.9	-7.8	-6.6	-6.3	-6.1	-7.0	-7.0	-7.5	-6.9	-6.8	-6.9	-5.9
22	-5.8	-5.8	-5.3	-5.4	-5.2	-5.1	-4.7	-5.1	-5.0	-5.1	-4.8	-5.0	-3.6	-2.7	-1.9	-1.3	-0.1	-0.3	-0.9	-1.1	-3.1	-4.8	-8.3	-8.5
23	-12.0	-13.5	-15.8	-17.1	-17.7	-18.2	-22.5	-22.5	-22.4	-22.3	-22.6	-21.2	19.7	-19.0	-18.4	-16.5	-17.0	-16.9	-15.2	-14.3	-14.2	-14.8	-14.3	-15.1
24	-14.8	-14.8	-17.0	-17.4	-17.4	-17.6	-17.5	-17.6	-17.6	-17.9	-18.5	-18.9	-19.4	-20.3	-23.1	-22.6	-23.5	-24.7	-23.9	-22.4	-23.7	-24.6	-26.1	-25.2
25	-28.0	-28.3	-27.1	-29.1	-29.5	-30.4	-28.2	-27.6	-30.8	-27.6	-26.0	-24.7	-24.0	-23.5	-21.3	-21.3	-18.6	-19.0	-16.4	-14.6	-15.0	-16.0	-17.2	-15.7
26	-15.8	-15.7	-15.8	-15.8	-14.5	-15.1	-14.8	-13.5	-13.8	-13.4	-13.0	-14.2	-14.3	-13.8	-14.1	-14.1	-14.2	-13.2	-13.2	-12.1	-11.9	-11.3	-11.5	-11.4
27	-13.7	-16.0	-17.7	-18.5	-18.7	-20.0	-21.1	-25.4	-27.9	-24.4	-23.3	-22.5	-21.2	-21.7	-21.1	-19.0	-17.6	-19.4	-19.0	-19.7	-19.8	-20.7	-22.1	-23.8
28	-25.1	-25.3	-25.6	-25.1	-23.8	-22.7	-21.2	-19.8	-19.4	-20.8	-11.9	-9.8	-8.3	-7.6	-7.2	-7.2	-6.9	-6.7	-6.6	-5.7	-5.4	-5.4	-5.3	-5.4

DRY-BULB TEMPERATURE SUMMARY*
SOMMAIRE DES TEMPÉRATURES DU THERMOMÈTRE SEC*

MONTH / MOIS: MARCH / MARS — 1982

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-4.3	-3.5	-4.4	-5.3	-6.6	-8.2	-8.4	-9.1	-10.0	-10.9	-10.7	-10.1	-9.3	-8.5	-8.1	-7.1	-6.7	-6.6	-7.0	-8.3	-8.9	-9.4	-10.3	-10.
2	-11.5	-12.8	-13.4	-14.2	-15.2	-16.0	-17.1	-17.7	-18.2	-18.1	-17.1	-15.3	-13.8	-12.5	-11.2	-9.5	-8.8	-8.7	-8.6	-10.5	-14.4	-15.9	-14.5	-16.
3	-16.5	-19.8	-23.1	-21.7	-22.9	-24.8	-23.7	-25.7	-24.6	-23.9	-20.5	-17.0	-13.3	-10.8	-9.3	-9.3	-9.2	-8.4	-8.7	-10.9	-12.0	-12.9	-12.4	-12.
4	-14.1	-15.7	-18.3	-18.3	-19.8	-20.0	-20.1	-21.5	-21.3	-19.6	-14.9	-10.4	-7.2	-6.1	-5.2	-3.8	-3.4	-3.7	-5.1	-5.7	-6.2	-7.7	-9.2	-9.
5	-11.2	-11.2	-12.0	-11.7	-13.1	-12.7	-13.6	-16.7	-17.4	-15.0	-13.6	-11.8	-9.9	-8.7	-7.8	-7.1	-6.3	-5.7	-6.3	-7.0	-7.0	-8.5	-8.9	-9.
6	-9.1	-9.5	-9.1	-9.7	-9.6	-9.5	-9.5	-9.7	-10.8	-10.1	-8.8	-7.4	-5.8	-6.2	-6.4	-5.7	-6.4	-8.0	-8.7	-10.5	-12.1	-13.4	-14.7	-15.
7	-17.1	-18.0	-18.9	-19.6	-22.4	-22.1	-21.8	-22.5	-23.3	-22.2	-20.1	-17.5	-15.5	-14.2	-13.5	-12.3	-11.9	-11.2	-11.6	-13.4	-14.7	-18.1	-20.0	-22.
8	-23.9	-24.2	-26.3	-26.1	-26.1	-26.1	-26.7	-27.3	-28.0	-25.7	-22.7	-18.5	-18.5	-12.8	-12.0	-11.8	-11.8	-11.4	-11.5	-11.8	-12.6	-14.3	-16.6	-16.
9	-19.1	-20.5	-21.8	-23.2	-24.1	-24.5	-24.9	-26.8	-25.2	-22.7	-19.0	-15.1	-12.2	-10.1	-9.8	-7.3	-7.5	-7.9	-8.6	-8.9	-9.5	-9.5	-9.7	-10.
10	-9.9	-8.9	-6.9	-6.9	-7.0	-7.2	-7.0	-7.0	-7.1	-6.4	-5.4	-4.7	-3.9	-3.8	-3.8	-4.0	-4.9	-4.9	-4.9	-5.1	-5.2	-5.6	-5.5	-5.
11	-9.3	-7.6	-6.8	-4.3	-5.2	-7.2	-9.9	-10.4	-8.9	-8.3	-6.1	-5.3	-4.0	-3.8	-2.1	-2.5	-2.4	-2.9	-3.8	-4.4	-6.0	-9.5	-12.9	-12.
12	-11.7	-12.5	-11.8	-11.3	-10.4	-10.4	-10.2	-9.5	-9.2	-8.1	-5.6	-3.3	-0.8	0.2	0.5	1.0	1.3	0.4	-0.2	-0.1	0.4	0.4	1.1	1.
13	1.9	2.3	2.0	0.7	0.7	0.7	-0.4	-0.7	-1.1	-1.2	-1.4	-2.3	-2.6	-2.8	-3.7	-3.1	-3.3	-3.0	-2.5	-1.4	-1.6	-2.1	-2.4	-2.
14	-3.6	-4.2	-4.8	-5.6	-5.9	-6.6	-7.5	-8.2	-8.2	-7.2	-5.8	-4.0	-2.3	-0.8	0.8	2.4	3.1	3.7	3.6	1.0	-1.0	-2.5	-2.6	-2.
15	-2.8	-2.7	-2.4	-2.6	-2.9	-2.5	-1.9	-1.9	-2.2	-1.3	0.3	3.1	2.6	2.5	2.8	2.1	1.5	1.3	1.0	0.8	0.4	0.6	0.9	0.
16	1.4	0.9	0.6	-0.3	-0.9	-0.9	-1.2	-1.2	-1.0	-1.0	-0.3	-0.3	0.4	1.1	1.4	1.4	1.0	1.3	1.5	1.1	0.6	1.2	1.0	0.
17	0.7	1.0	0.6	0.1	-0.1	0.1	0.1	0.4	0.4	0.8	2.2	2.3	2.5	1.9	2.1	2.4	2.0	2.1	1.8	1.2	0.8	0.7	0.7	0.
18	0.5	0.2	0.0	-0.8	-1.2	-1.3	-2.3	-2.7	-2.8	-2.7	-2.9	-2.4	-2.3	-1.5	0.4	1.7	1.8	1.1	0.6	-0.2	-1.3	-3.3	-5.3	-7.
19	-8.9	-9.6	-10.3	-11.4	-12.0	-12.7	-12.7	-13.8	-12.4	-11.6	-9.7	-7.8	-7.1	-5.9	-4.8	-3.7	-3.1	-2.2	-2.6	-3.5	-4.4	-6.4	-7.0	-8.
20	-8.4	-8.0	-7.7	-7.1	-7.1	-7.4	-7.5	-7.3	-7.1	-6.4	-5.6	-5.4	-4.2	-3.7	-2.5	-2.0	-1.8	-1.6	-1.9	-1.9	-1.8	-1.2	-1.1	-1.
21	-2.4	-3.3	-2.7	-2.4	-2.3	-2.4	-2.7	-3.4	-3.4	-3.3	-1.5	1.0	3.2	4.6	5.5	6.4	6.3	6.2	5.3	4.1	1.9	0.7	0.5	0.
22	-0.7	-2.1	-2.1	-2.7	-2.8	-3.8	-5.0	-5.9	-6.2	-5.0	-3.7	-2.6	-0.7	-0.1	1.1	2.7	3.6	3.0	1.0	-0.3	-1.1	-2.5	-4.5	-5.
23	-5.4	-6.4	-6.7	-6.4	-6.5	-7.9	-7.7	-7.1	-6.1	-4.2	-2.2	1.0	1.6	2.6	4.0	4.1	4.5	3.9	2.5	1.7	0.5	0.3	0.3	-0.
24	-0.4	-0.6	-0.1	-0.2	-0.3	-0.3	-0.3	0.8	2.1	0.8	1.9	1.9	2.1	2.7	2.3	0.1	0.6	1.1	0.5	-0.2	-0.9	-1.5	-1.	
25	-1.6	-1.6	-1.6	-2.2	-2.9	-3.6	-4.5	-5.2	-5.7	-6.1	-7.1	-6.8	-6.3	-5.7	-5.0	-5.0	-5.0	-5.3	-5.7	-6.9	-7.9	-8.3	-8.9	-9.
26	-11.4	-12.1	-12.9	-13.5	-14.4	-15.0	-15.5	-15.8	-15.7	-14.4	-13.1	-11.2	-9.7	-8.7	-7.8	-7.0	-6.3	-5.9	-5.6	-5.9	-7.8	-10.3	-11.7	-13.
27	-14.1	-16.0	-17.6	-16.1	-15.2	-18.0	-17.6	-17.9	-17.6	-15.0	-12.7	-11.4	-9.6	-8.1	-6.1	-5.6	-4.1	-4.2	-4.6	-5.7	-6.3	-8.1	-10.0	-10.
28	-11.7	-12.9	-13.0	-15.6	-14.8	-13.0	-11.4	-10.9	-8.2	-6.6	-4.1	-0.9	3.6	4.8	4.6	4.0	3.7	3.9	4.7	4.1	4.2	3.6	3.1	3.
29	4.2	3.2	3.0	1.6	1.4	1.1	1.1	1.4	1.3	2.4	2.3	3.8	4.8	5.2	5.3	4.3	4.1	4.0	3.2	2.9	2.3	2.4	2.4	2.
30	3.2	1.8	1.6	1.2	1.1	1.0	1.1	1.1	1.4	1.6	2.7	2.2	2.6	2.7	2.5	2.4	3.0	2.6	2.4	2.4	1.8	2.3	2.0	2.
31	2.1	1.4	1.4	1.4	1.3	1.3	1.4	1.8	4.1	4.0	3.9	4.5	4.9	5.0	4.7	4.8	3.7	2.7	2.2	1.2	0.5	0.0	-0.4	-1.

*Temperatures in tenths of degrees Celsius – Températures en dixième de degrés Celsius

DEWPOINT TEMPERATURES – SOMMAIRE DES TEMPÉRATURES DU POINT DE ROSEE

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	-5.2	-5.1	-8.6	-9.2	-11.6	-12.5	-12.7	-13.3	-14.7	-15.6	-15.7	-15.4	-14.9	-15.1	-14.8	-13.8	-14.0	-13.8	-14.4	-14.8	-14.3	-16.2	-15.7	-16.
2	-16.0	-16.7	-18.0	-18.4	-19.2	-19.8	-20.6	-21.9	-25.2	-24.9	-25.2	-24.2	-24.8	-23.6	-23.6	-22.6	-22.9	-23.8	-23.8	-24.9	-23.8	-24.3	-25.6	-26.
3	-25.8	-26.1	-28.9	-27.5	-27.9	-29.6	-28.0	-30.5	-29.2	-28.8	-26.8	-23.9	-22.0	-21.4	-21.4	-18.1	-17.7	-14.8	-15.3	-14.6	-15.2	-15.0	-14.8	-14.
4	-16.2	-17.6	-23.8	-22.0	-23.8	-23.8	-24.0	-25.6	-25.2	-23.8	-19.6	-16.2	-16.0	-15.7	-15.6	-17.1	-13.7	-12.2	-10.8	-11.6	-11.6	-12.3	-13.8	-13.
5	-14.7	-14.7	-15.2	-14.9	-16.3	-16.5	-16.8	-19.7	-19.8	-19.2	-19.0	-21.4	-20.6	-19.2	-18.0	-18.8	-18.1	-18.5	-18.9	-18.5	-19.4	-19.7	-19.4	-19.
6	-20.3	-20.3	-20.3	-19.8	-19.2	-17.7	-16.7	-16.4	-16.8	-15.6	-14.6	-14.4	-13.4	-14.3	-15.2	-16.2	-16.6	-18.8	-19.5	-22.4	-25.8	-25.2	-24.7	-25.
7	-26.2	-26.8	-27.5	-27.6	-28.5	-28.5	-28.9	-29.5	-29.4	-29.0	-28.3	-27.3	-26.6	-26.4	-25.9	-25.6	-25.6	-25.2	-25.2	-21.5	-22.4	-24.3	-25.5	-27.
8	-30.0	-29.8	-32.3	-31.5	-31.6	-31.7	-32.0	-32.6	-32.9	-31.2	-29.5	-27.5	-24.2	-24.3	-20.9	-17.6	-15.5	-16.6	-14.2	-13.9	-14.5	-15.5	-17.6	-17.
9	-20.5	-22.0	-27.7	-28.4	-28.9	-28.8	-29.2	-31.2	-29.7	-27.5	-24.6	-22.7	-22.8	-20.0	-17.1	-16.0	-15.8	-15.5	-16.1	-16.2	-15.6	-14.8	-13.8	-12.
10	-11.3	-10.3	-10.5	-10.5	-11.1	-11.2	-11.2	-11.0	-10.7	-10.2	-9.8	-8.6	-7.9	-7.5	-6.8	-7.3	-6.5	-5.9	-5.7	-6.1	-6.2	-6.6	-6.9	-7.
11	-9.9	-8.8	-9.0	-7.1	-8.7	-10.5	-11.8	-11.6	-11.0	-10.5	-9.8	-9.9	-9.2	-9.1	-9.8	-9.9	-8.9	-9.5	-9.9	-9.8	-9.5	-10.5	-13.5	-13.
12	-12.7	-13.7	-12.7	-12.3	-11.3	-11.3	-11.3	-10.5	-10.3	-9.0	-6.6	-4.3	-3.8	-2.9	-3.1	-3.0	-2.5	-2.0	-1.1	-1.0	-0.3	-0.1	0.4	0.
13	0.6	0.3	-0.2	-2.3	-3.5	-3.5	-4.2	-5.2	-5.2	-4.6	-6.6	-5.7	-8.4	-8.8	-8.5	-8.1	-8.2	-8.7	-7.8	-6.9	-7.3	-7.6	-7.9	-7.
14	-9.7	-10.4	-10.0	-10.5	-10.8	-11.2	-11.9	-12.6	-13.0	-12.8	-12.5	-11.3	-12.5	-11.0	-10.9	-11.9	-10.7	-12.2	-12.4	-7.1	-7.7	-6.2	-6.1	-5.
15	-5.8	-5.1	-6.5	-6.4	-6.1	-6.6	-5.3	-4.6	-4.4	-4.5	-4.0	-5.9	-5.0	-5.4	-6.3	-5.7	-4.9	-5.0	-4.8	-4.1	-3.6	-3.3	-3.8	-2.
16	-4.4	-4.2	-4.5	-3.5	-2.4	-1.9	-1.9	-2.0	-1.9	-2.3	-2.3	-2.2	-3.0	-3.1	-3.5	-4.3	-3.5	-4.2	-4.0	-3.9	-3.1	-4.3	-4.0	-4.
17	-3.6	-3.9	-3.5	-2.7	-2.5	-2.6	-2.7	-3.0	-3.1	-2.6	-4.3	-4.3	-3.5	-2.6	-2.7	-2.6	-2.4	-2.3	-2.4	-2.3	-2.2	-2.1	-2.0	-2.
18	-2.1	-1.9	-1.5	-1.7	-1.9	-1.9	-3.4	-3.8	-4.4	-4.8	-5.5	-6.4	-6.1	-6.5	-5.5	-5.0	-4.5	-5.2	-5.1	-6.6	-7.6	-9.8	-11.4	-12.
19	-14.2	-14.4	-14.6	-15.8	-15.2	-16.0	-15.7	-16.2	-16.2	-15.6	-15.2	-14.3	-14.1	-13.2	-13.1	-12.2	-12.3	-13.5	-13.4	-14.1	-14.7	-13.2	-14.7	-13.
20	-13.8	-14.4	-14.8	-15.1	-15.0	-14.4	-13.7	-13.5	-13.7	-12.7	-12.1	-12.7	-12.0	-13.9	-13.8	-11.6	-12.0	-12.2	-10.5	-9.8	-12.2	-13.6	-13.4	-9.
21	-7.1	-4.9	-4.0	-3.5	-3.8	-4.1	-4.3	-5.5	-5.8	-5.6	-5.2	-5.8	-7.7	-9.0	-11.0	-11.0	-10.1	-9.2	-7.9	-7.8	-5.8	-5.4	-5.2	-5.
22	-5.1	-5.8	-6.6	-7.5	-8.5	-9.2	-10.5	-11.1	-11.1	-10.8	-10.4	-10.4	-9.4	-10.6	-11.1	-10.9	-10.2	-6.4	-5.0	-5.3	-5.3	-5.6	-6.6	-7.
23	-6.8	-7.5	-7.9	-7.9	-7.3	-8.8	-8.8	-8.3	-7.3	-5.2	-4.3	-4.2	-4.3	-4.2	-4.1	-3.3	-2.7	-1.6	-1.4	-1.2	-1.6	-2.0	-1.9	-2.
24	-2.2	-2.4	-2.2	-1.7	-1.0	-0.8	-0.9	0.1	0.1	0.0	-0.6	-1.4	-1.1	-0.2	-0.1	-0.3	-0.4	-0.6	-2.4	-2.8	-3.5	-3.8	-4.4	-4.
25	-4.3	-3.8	-4.7	-4.9	-6.0	-6.4	-7.2	-8.2	-9.3	-9.6	-10.8	-10.6	-10.6	-11.3	-10.1	-10.5	-10.3	-11.0	-12.0	-15.3	-16.2	-15.7	-15.3	-14.
26	-15.7	-15.5	-16.2	-16.5	-17.2	-18.5	-19.3	-21.9	-22.0	-21.8	-22.1	-20.8	-20.6	-19.5	-19.9	-19.4	-20.0	-20.1	-20.4	-19.5	-19.4	-19.1	-18.0	-18.
27	-19.5	-21.0	-21.8	-22.0	-22.0	-23.8	-22.9	-23.2	-23.0	-22.3	-22.9	-22.4	-22.5	-22.5	-22.6	-19.0	-19.0	-17.4	-17.3	-11.9	-11.0	-11.1	-12.8	-12.
28	-13.7	-14.8	-15.1	-17.7	-16.4	-14.8	-14.1	-13.1	-10.3	-9.1	-7.7	-6.1	-4.9	-4.2	-4.7	-4.3	-2.8	-2.0	-1.1	-1.0	-1.1	-0.7	-0.3	-0.
29	-0.3	-0.2	-0.4	-0.3	-0.3	-0.3	-0.3	-0.4	-0.5	-1.1	-0.7	-1.9	-3.4	-3.5	-3.8	-2.9	-2.3	-2.3	-2.2	-2.2	-1.4	-1.4	-1.4	-1.
30	0.0	0.4	0.3	0.2	0.1	0.0	0.3	0.6	0.6	0.8	1.8	1.2	1.5	2.0	1.5	0.7	1.7	1.7	1.6	1.9	1.5	2.1	1.7	1.
31	1.7	1.0	1.2	1.1	1.0	1.0	1.1	1.5	2.5	2.2	0.8	0.5	-0.5	-0.4	-0.5	-2.4	-3.9	-3.9	-4.4	-4.6	-5.9	-6.1	-7.6	-8.

POOR

QUALITY

ORIGINAL